THE IRON TRADE REVIEW

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Buyers Show Faith in Continuance of Prosperity

By Placing Orders As Far in Advance As They Are Permitted by Mills — Less Insistent Demand for Deliveries Gives Mills Some Relief

That in spite of politics and all kinds of agitation some of the largest iron and steel consumers are willing to demonstrate their faith in continued prosperity is shown by the fact that heavy orders are being taken from some of the most important buyers of the country by leading sellers for delivery during the second, third and fourth quarters of next year. Plans for new construction are not lacking. Appropriations have been made for building at the Duquesne works of the Carnegie Steel Co. the largest and most modern merchant mill in the country. This mill will be electrically operated and fitted with the latest improvements.

Iron Ore

Shipments of iron ore this season already exceed the entire movement for the banner year, 1910, when 42,628,758 tons were moved by lake. It is expected that the shipments for October will exceed 7,000,000 tons, making the total to Nov. 1 about 43,500,000 tons, and insuring a tonnage of more than 46,000,000 for the season. Some reservations for old range Bessemer ores are being made, but ore companies are discouraging early buying. Some sales of local New York and New Jersey state iron ores have been made on a basis of 8 cents per unit for this year's delivery. No action has yet been taken concerning prices of Port Henry district ores for next year's delivery. A Greek steamer has been charatered for a cargo of Spanish ore, for delivery at Philadelphia, at 12s 9d. This is the highest freight rate paid on Spanish ore for 20 years. Freight rates on foreign ores are at present practically prohibitive.

Pig Iron

Sales of Bessemer pig iron in Pittsburgh and the valleys during the past week or ten days are estimated at 40,000 tons, at $17, valley. Recent sales of basic include 35,000 tons at Pittsburgh, made about two weeks ago, but not heretofore announced. Basic seems to be established at $16.25 and No. 2 foundry at $17, valley. The Pittsburgh Steel Co. is inquiring for 10,000 tons of basic for this year and is seeking to cover for all its requirements for the first half of next year. The Pennsylvania railroad has distributed an order for 5,200 tons of various grades for pig iron for delivery at Altoona. The minimum quotation of $13.50, Birmingham, for No. 2 foundry is rapidly disappearing and one leading southern interest is asking $15 for second quarter delivery.

Middle western makers have been offering large blocks of Bessemer pig iron for forward delivery to leading consumers and the minimum in these negotiations has been $17, valley. On larger tonnages, $17.50 is asked. Reports that the Steel Corporation is likely to buy blocks of basic or Bessemer in the open market in the near future is not officially confirmed and it is well established that the leading interest will probably be able to fill its full needs from its own furnaces.

Bar Iron

One of the very interesting features of present conditions is the strong demand for bar iron which has resulted in mills long out of commission being brought into activity. The principal trouble with all of the iron mills nowadays is to obtain puddlers. Bar iron makers are steadily advancing their prices throughout the country.

Railway Buying

The tremendous demand for track fastenings indicates the very heavy buying which is being done in rails. Spikes, splice bars and tie plates are being contracted for on a scale that has not been duplicated for a number of years. One seller sold more than 4,000,000 tie plates last week. In other lines, the railroads also continue to buy heavily and have placed some large orders for bars. There is also more liberal contracting for bridge material. The Lehigh Valley is about to place its rail order. The Pennsylvania is understood to have placed large supplemental rail orders for next year's delivery with the Cambria and Pennsylvania Steel companies, in addition to initial orders placed several weeks ago amounting to about 130,000 tons. The Chicago, Milwaukee & St. Paul has placed a new order for 65,000 tons with the Illinois Steel Co. The Canadian Northern, which has been inquiring for 35,000 tons, has placed its order with English mills. The rail mills of the Steel Corporation are practically sold up for the first half of next year and for the first time in a number of years will run to full capacity throughout the winter.

PITTSBURGH

Deliveries the Paramount Consideration

Office of THE IRON TRADE REVIEW, 2148-49 Oliver Bldg., Oct. 29.

The paramount question with mills in this district is that of deliveries. Leading manufacturers of iron and steel products are out of the market as far as anything like prompt material is concerned, some of them declining to quote on first quarter tonnage, and a few are well filled up for the first half of the second quarter. Little or no relief is in sight. In some lines contracting is falling off slightly, much to the satisfaction of the over-crowded mills. Quotations for shipment after the first of the year are firmly maintained, and from $2 to $4 a ton is being obtained on tonnage for rather prompt delivery.

About 40,000 tons of first half Bessemer was obtained the last ten days at $17, valley. One lot alone involved 25,000 tons. Basic is firmly established at $16.25, valley; foundry has sold at $17 for next year's shipment, and malleable is being quoted from $16.50 to $17, valley.

Spot furnace coke is gradually reaching the $4, ovens, mark, and producers are holding contract fuel at $3.50 and $3.75, ovens. Complaint is heard from consumers regarding the price of standard coke. The semi-finished steel situation is even more acute and fancy prices are being paid for both Bessemer and open-hearth products. Iron pipe has been advanced from $2 to $8 a ton, advances being provided in a re-classification of sizes. Standard spikes are stiffening.

Pig Iron.—One of the leading pig iron interests this afternoon estimated that sales of Bessemer the last week or ten days aggregated 40,000 tons, for first half shipment to melters in this and the valley district. So far as can be ascertained all of this iron was obtained at $17, valley, although rumors of $17.25, valley, prices are heard. Basic, which has been in good demand, seems to be firmly established at $16.25, valley. One interest obtained in the neighborhood of 5,000 tons for shipment during second quarter at $16.25, valley, and another consumer contracted for about the same tonnage for first half shipment at the same figure. In both instances, consumers advise that it would be impossible to shade the $16.25, valley, quotation. Sellers are asking from $16.25 to $17, valley. No. 2 foundry has sold at $17, valley. Today a round tonnage for first half shipment sold at that figure, and it is doubted whether it is possible to shade it. A half dozen foundry interests have been buying iron to supplement this year's tonnage or for first half needs. Small lots of malleable have been sold to car wheel and mine car interests, at $16.50, valley, and slightly above. Gray forge iron has been in good demand and sales as high as $16.25, valley, are reported. Several sellers are quoting $18, valley, on Bessemer, and some are refusing to shade $17 for malleable, foundry or basic, but actual sales indicate it is possible to close contracts at considerably less, on some grades. The Pittsburgh Steel Co. is inquiring for 10,000 tons of this year's basic, and is negotiating for full requirements for the first half of 1913. The scarcity and high price of coke is causing more than usual anxiety on the part of blast furnace operators. At least five furnaces in this district would re-light if fuel could be obtained at a "reasonable" figure. We quote all grades for shipment the remainder of the year and first quarter as follows:

(Remainder of Year and First Quarter.)

Bessemer, valley	$17.00
Bessemer, Pittsburgh	17.90
Basic, valley	16.25
Basic, Pittsburgh	17.15
No. 2 foundry, valley	17.00
No. 2 foundry, Pittsburgh	17.90
Gray forge, valley	15.75 to 16.30
Gray forge, Pittsburgh	16.65 to 16.90
Malleable, valley	16.50
Malleable, Pittsburgh	17.40

Ferro-Alloys.—Several sales of ferro-manganese for prompt shipment have been made this week and agents report no trouble is experienced in obtaining $75, Baltimore. As a general rule, dealers are refusing to sell for forward shipment. Fifty per cent ferro silicon is quoted at $75, f. o. b. furnace, but it is difficult to obtain material for shipment next year. No change in the price of ferro-titanium is noted.

We quote 80 per cent ferro-manganese at $61 to $75, Baltimore, for prompt delivery and $59.50 to $61 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $25; 11 to 12 per cent, $24; 10 to 11 per cent, $23; 9 to 10 per cent, $22, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.50. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2 000 pounds.

Plates.—Leading plate makers are out of the market for the remainder of the year and as a general rule it is impossible to obtain tonnage for first quarter shipment except for specific contracts. Plates are quoted 1.45c to 1.50c, for shipment after Jan. 1. The Pennsylvania railroad has placed an order for 5,000 freight cars, of which 1,000 automobile and 3,000 box cars will be built by the Pressed Steel Car Co., and 1,000 box cars will be built by the company at its Altoona, Pa., shops. It is understood that both the Pennsylvania and New York Central interests are negotiating for additional freight cars. The latter interest is in the market for 207 passenger cars. The contract for the Los Angeles aqueduct has been awarded the Riter-Conley Mfg. Co., Pittsburgh, and the Lacy Mfg. Co., Los Angeles. About 8,000 tons of riveted pipe will be used in this project. Heavy tonnages of plates are involved in pending transactions. We quote plates as follows, for shipment after Jan. 1:

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.50c for shipment after Jan. 1 and 1.60c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets. — Heaviest consumers of sheets have covered requirements through the first quarter and some have been able to obtain material for second quarter needs. Prevailing quotations are being maintained firmly, and mills in a position to make prompt shipment are enjoying $2 premiums. Specifying has been heavy, and to the full extent of contracts in all instances. The scarcity of raw material, combined with an insufficient number of employes, has made it somewhat embarrassing for a few of the manufacturers. The following

quotations prevail for first and second quarter shipment; where prompt material is necessary, consumers are obliged to pay from $1 to $3 a ton more:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.90 per 100 pounds; Nos. 13-14 gage, $1.95; Nos. 15-16 gage, $2.00; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-26 gage, $2.15; No. 27 gage, $2.20; No. 28 gage, $2.25; No. 29 gage, $2.30; No. 30 gage, $2.40.

Tin mill sizes, Nos. 15-16 gage, $2.00 per 100 pounds; Nos. 17-21, gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-27 gage, $2.15; No. 28 gage, $2.20; Nos. 29-30 gage, $2.25; Nos. 30½-31 gage, $2.30; No. 32 gage, $2.35.

Blue Annealed.—Nos. 3-8, $1.60 per 100 pounds; Nos. 9-10, $1.65; Nos. 11-12, $1.70; Nos. 13-14, $1.75; Nos. 15-16, $1.85.

Galvanized.

Nos. 10-11 gage, $2.40 per 100 pounds; Nos. 12-14 gage, $2.50; Nos. 15-16 gage, $2.65; Nos. 17-21 gage, $2.80; Nos. 22-24 gage, $2.95; Nos. 25-26 gage, $3.10; No. 27 gage, $3.25; No. 28 gage, $3.40; No. 29 gage, $3.55; No. 30 gage, $3.70.

Roofing Sheets.

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate.—Tin plate makers are booking heavy tonnages and from present predictions the heaviest consumers will be well under cover by the middle of next month for first half requirements. The $3.60, base price, is being maintained firmly. We quote:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Material.—No large orders for rails are reported this week. Mills have sufficient tonnage on their books to necessitate maximum operation through the first quarter in many instances. Standard spikes are now being quoted from $1.80 to $1.90, and it is probable the minimum quotation soon will disappear. Talk of an early advance in the price of light rails is heard, but no official statement has been made. Rails are quoted as follows, with the base price on open-hearth standard sections at 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.10c to 2.25c, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	$1.80 to $1.85
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars.—Open-hearth rolling billets have sold as high as $28, Pittsburgh, the last week, and a sale of open-hearth sheet bars at $30, Pittsburgh, is reported, but it is impossible to verify the latter transaction. Consumers who have not covered first quarter requirements are confronting a serious situation, as leading semi-finished producers announce that they will have no tonnage to offer. Each additional sale is made on a higher basis than the one preceding, and it is almost impossible to offer anything but nominal quotations, which follow:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $26.50 to $27.00, with the usual extra for size and analysis, and open-hearth rolling billets, $27.00 to $27.50. Bessemer sheet and tin bars are quoted at $27.50 to $28.00 and open-hearth sheet bars are quoted $28.00 to $28.50, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $33.00 to $34.00, Pittsburgh.

Hoops and Bands.—Bands are firm at 1.40c and hoops at 1.50c. Although no official announcement has been made, it is not at all improbable that hoops will be advanced in the near future. Manufacturers believe hoops should not be quoted below 1.60c to enjoy a reasonable profit. Specifying for both products is heavy, but there is little new demand. Quotations follow:

Hoops in carload lots, 1.50c; Pittsburgh; in less than carload lots, 1.55c; bands 1.40c to 1.45c, base, with net extras, as per standard steel.

Merchant Bars.—The question of shipments is of most importance to manufacturers of steel bars. Some of the mills have been forced to withdraw from the market, being unable to promise material before the second quarter. Iron bars have advanced $1 a ton, and are now quoted at 1.60c to 1.65c, and is is impossible to place anything but desirable tonnages at the minimum figure. There is some talk of an advance among manufacturers of cold rolled shafting, although proposed new quotations are not expected to take effect until the end of the year. One of the shafting manufacturers broke all previous records last month from a standpoint of specifying against contracts. The following quotations prevail, although premiums are demanded for prompt shipment:

Common iron bars, 1.60c to 1.65c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c to 1.45c; plow and cultivator, 1.40c to 1.45c; channels, angles, zees, tees, under 3 inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds, 0.35. Cold rolled and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads delivered in base territory.

Muck Bar.—Makers of muck bar claim it would be impossible to obtain this material at less than $32, Pittsburgh. In the absence of sales, it is possible only to give nominal quotations. We quote muck bar at $31.50 to $32, Pittsburgh.

Rivets, Nuts and Bolts.—New quotations, announced a week ago, are being maintained firmly. Shipments are more and more deferred each week, and some manufacturers are unable to promise material before February. Five per cent above the following quotations is asked on all products when shipment after Jan. 1 is requested.

Rivets

Button head structural rivets, 2c; cone head boiler rivets, 2.10c.

Bolt and Nut Discounts

Carriage bolts, ¾ x 6 inches, smaller and shorter, rolled threads, 75, 10 and 2½; cut threads, 75 and 7½; cut, 75, 10 and 2½; larger and longer, 70 and 10.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled, 75, 10, 10 and 2½; cut, 75, 10 and 7½; larger and longer, 70, 10 and 5.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.80 off list; hot pressed hexagon blank or tapped, $6.40.

Cold pressed C. & T. square, blank or tapped, $5.80 off; hexagon, blank or tapped, ½-inch and larger, $6.70 off; smaller than ½-inch, $7.30 off.

Structural Shapes.—The McClintic-Marshall Construction Co. has taken contracts for the following: Two dock gates, involving 900 tons, to be built at Balboa, near the Pacific entrance to the Panama canal; 300 tons for an extension to the car shops of the Osgood Bradley Car Co., Worcester, Mass., and 2,000 tons for a merchant mill to be built by the Forged Steel Wheel Co., at Butler, Pa., work on which will begin in the immediate future. Several important undertakings are being considered. The General Electric Co. will require from 1,200 to 1,500 tons for a new machine shop at Erie, Pa., and about 2,000 tons will be used in the proposed Masonic Temple, to be erected in the Shenley Farms district, this city. It is also understood that the Monongahela House, this city, is to be replaced by a modern structure. Shapes are quoted at 1.45c to 1.50c, for shipment after Jan. 1. Prices follow:

Beams and channels 15 inches and under, zees, 1.45c to 1.50c; tees, 1.50c to 1.55c; angles, from 3 to 6 inches, 1.45c to 1.55c; over 6 inches, 1.55c to 1.60c; universal and sheared, 1.45c to 1.50c. For prompt shipment, minimum quotation is $2 per ton higher.

Merchant Pipe.—Rather heavy tonnages of iron and steel pipe are involved in pending inquiries, but no large orders have been placed this week. Some of the leading pipe makers are out of the market, and it

is probable that much of the tonnage involved in pending transactions will be carried over the end of the year. One of the independent manufacturers of wrought iron pipe issued a revised card Oct. 21, which shows advances from $2 to $8 a ton on some of the smaller sizes. Sizes are grouped to correspond to the classification of steel pipe, adopted early in September by all makers in this district. We adopt the new iron pipe card, despite the fact that it has not yet become general. Official discounts to jobbers, subject to the preferential discount to the large buyer, are as follows:

Iron and Steel Pipe Basing Prices

STEEL.

	Butt. Black.	Butt. Galv.	Lap. Black.	Lap. Galv.
⅛, ¼ and ⅜ inch.	72	52	..	..
½ inch	76	66	..	..
¾ to 3 inch.....	79	71	..	..
2 inch	..	..	76	68
2½ to 6 inch.....	..	..	78	70
7 inch to 12 inch..	..	..	76	66
13 to 15 inch.....	..	..	53	..
Extra Strong, Plain Ends.				
⅛, ¼ and ⅜ inch.	68	58	..	..
½ inch	73	67	..	..
¾ to 1½ inch.....	77	71	..	..
2 to 3 inch.....	78	72	..	..
2 inch	..	..	74	66
2½ to 4 inch.....	..	..	76	68
4½ to 6 inch.....	..	..	75	67
7 to 8 inch.....	..	..	68	58
9 to 12 inch.....	..	..	63	53
Double Extra Strong Plain Ends.				
½ inch	63	57	..	..
¾ to 1½ inch.....	66	60	..	..
2 to 2½ inch.....	68	62	..	..
2 inch	..	..	64	58
2½ to 4 inch.....	..	..	66	60
4½ to 6 inch.....	..	..	65	59
7 to 8 inch.....	..	..	58	48
IRON.				
⅜ inch	67	51	..	..
½ inch	70	57	..	..
¾ to 1½ inch.....	73	62	..	..
2 and 2½ inch.....	74	63	..	..
2 inch	..	..	70	61
2½ to 4 inch.....	..	..	72	64
4½ to 6 inch.....	..	..	71	63
7 to 12 inch.....	..	..	69	56
Extra Strong Plain Ends, Card Weight.				
⅜ inch	64	53	..	..
½ inch	68	61	..	..
¾ to 1½ inch.....	72	63	..	..
2 and 2½ inch.....	73	64	..	..
2 inch	..	..	67	61
2½ to 4 inch.....	..	..	71	64
4½ to 6 inch.....	..	..	70	63
7 to 8 inch.....	..	..	64	54
9 to 12 inch.....	..	..	59	48
Double Extra Strong Plain Ends, Card Weight.				
½ inch	58	50	..	..
¾ to 1½ inch.....	61	53	..	..
2 and 2½ inch.....	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch.....	..	..	61	55
4½ to 6 inch.....	..	..	60	54
7 and 8 inch.....	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes.—Demand for steel and iron tubes continues fairly heavy and specifying has been liberal. Although orders are small, they represent rather heavy tonnages in the aggregate. The following quotations prevail:

	Steel.	Iron.
1½ inch	..	..
1¾ to 2¼ inch.....	62	47
2½ inch	64½	52
2¾ to 3¼ inch.....	69½	54½
3½ to 4½ inch.....	72	57
5 and 6 inch	64½	..
7 to 13 inch.....	62	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire.—No change in the wire market is noted. The leading interest continues to quote $1.70 on nails and all of the independents, with one exception, are adhering to that price. That $1.75 will become the ruling quotation when books for 1913 shipment are opened, is the general belief in the trade. Nearly all the tonnage placed at $1.60 has been shipped and some of the mills have filled nearly all their contracts based at $1.65. Specifying, with few exceptions, is to the full extent of contracts and shipments continue heavy. We quote the market as follows:

Wire nails, jobbers' carload lots, $1.70 to $1.75, retailers' carload lots, $1.75 to $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.70 to $1.75; retailers' carload lots, $1.75 to $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.50 to $1.55; and to dealers, in carloads, $1.55 to $1.60; polished staples, $1.70 to $1.75; galvanized staples, $2.10.

Wire Rods.—Both Bessemer and open-hearth wire rods are somewhat scarce, and some makers are refusing to quote below $30. That the $28 quotation has entirely disappeared is the consensus of opinion in the trade. We quote Bessemer and open-hearth rods at $29, Pittsburgh.

Coke.—Spot furnace coke is gradually being established at $4, ovens. Yesterday one of the heaviest consumers in this district, not in urgent need of fuel, paid $4, ovens, for more than 1,000 tons, to be shipped the next week or ten days. A number of brokers have obtained $4.10 and $4.15, ovens, for small lots, although such sales represent the extreme of the market. Despite the rather heavy tonnage of contract furnace fuel involved in pending transactions, no sales have been made since the $2.75, ovens, quotation was ruling. As high as $3.50 and $3.75, ovens, is being quoted on contract standard fuel, although it is believed the minimum quotation could be shaded slightly. The general market for contract furnace coke has not been above $3 for many years. Foundry coke is selling at $4.25, ovens, for spot shipment, and as high as $4.50, ovens, has been obtained on small lots. The Connellsville *Courier* for the week ending Oct. 19 says production made a gain of 1,942 tons compared with the week before. Furnace ovens made the greater increase. Shipments made a net increase of 186 cars. Quotations follow:

Connellsville furnace	$3.85 to 4.00
Connellsville furnace contract.....	2.75
Connellsville foundry	4.00 to 4.50
Connellsville foundry contract....	3.50

Old Material.—Dealers have had no difficulty in obtaining as high as $16.25 for heavy melting steel this week, and 25 cents above this figure has been paid in several instances for extra quality stock. Some of the consumers, however, declare that it would be possible to shade $16 for desirable tonnage. Rerolling rails have sold at $17, and bundled sheet scrap has advanced to $13.75. No. 1 wrought scrap is almost on a basis with heavy melting stock, and is quoted at $15.75 to $16. The Pennsylvania railroad company this week asked bids on a rather heavy tonnage of miscellaneous scrap, part of which will be sold in this district. The old material market is fully as strong, but not so excited as it was a week ago. Quotations per gross ton for delivery in the Pittsburgh district, are as follows:

Heavy melting scrap.....	$16.00 to 16.25
Rerolling rails	16.50 to 17.00
Malleable	14.50 to 15.00
Bundled sheet scrap.....	13.25 to 13.75
Iron axles	25.00 to 26.00
Old iron rails	16.50 to 16.75
Stove plate	11.00 to 11.50
No. 1 wrought scrap.....	15.75 to 16.00
Old car wheels.....	15.75 to 16.25
Low phosphorus	18.50 to 19.00
Machine shop turnings.....	11.50 to 12.00
Cast borings	10.25 to 10.75
No. 1 cast scrap.....	14.50 to 15.00

Another Grace Boat Placed

W. R. Grace & Co., the English shipping firm, have formally closed a contract with the Wm. Cramp & Sons Ship & Engine Building Co. for the construction of a third large steamship to ply through the Panama canal and engage in trade on both the Pacific and Atlantic coasts. This vessel was arranged for when the original contract for the first of a fleet of boats was placed several months ago, which represented the first time the Grace interests had commissioned an American yard to build any of its ships. The new vessel is to be 435 feet length, 53 feet beam, and to have a dead load capacity of 10,000 tons. The boat is for delivery in July. It is announced that the company will place a large passenger boat with the same builder at a little later date.

New Officers of Perry Iron Co.

The Perry Iron Co., owner of the Perry stack, Erie, Pa., recently acquired by Pickands, Mather & Co., Cleveland, has elected the following officers: President, A. C. Dalton; vice president, George Beaumont; treasurer, E. P. Williams; secretary, M. L. Mozier.

CHICAGO

Upward Tendency in Finished Material Prices

Office of THE IRON TRADE REVIEW,
1328 Monadnock Blk., Oct. 29.

Prices on finished material in this territory are even stronger and in spite of the efforts of leading producers to keep the market on a safe basis, a marked upward tendency is evident. One of the largest independent producers in this district, as well as the leading interest, now has sufficient business on its books to tax its capacity for almost a year. On account of the dearth of re-rolling rails, hard steel bars have advanced to a minimum of 1.60c, and business in some instances has been placed at 1.70c. Increasing scarcity of structural material is still embarrassing the fabricators and the contracts taken consist principally of small tonnages which can be obtained from store.

Pig Iron.—Shading on northern iron has almost disappeared and the market remains very firm on a basis of $17.50, local furnaces. Inquiries continue at about the same rate and sales in lots ranging from 100 to 1,000 tons are being made in fair numbers. The leading interest continues to quote $18 at the Bay View furnaces and has but a limited tonnage to offer for first half delivery.

Although $14, Birmingham, is still the nominal minimum quotation on southern iron, offers at that figure must be submitted to the furnaces. Sales of southern iron continue at a good rate and the inquiry for spot iron is considerably stronger. A sale of 300 tons to a local melter at $14.50, Birmingham, was made during the week and is the first to be reported at that price. Other business placed includes lots of 300, 500 and 1,000 tons to northern Illinois melters. Buying of both northern and southern iron now consists largely of re-orders to fill in and purchases by small consumers. Many large melters, who considered themselves well covered for the first half, continue to find it necessary to come into the market for small tonnages from time to time.

The following prices represent the market for Chicago delivery, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces:

	Rest of year.	First quarter.
Lake Superior Charcoal	$18.75	$19.25
Northern foundry No. 2	17.50	17.50
Southern foundry No. 2	18.35	18.35
South'n Silveries, 5 per cent sil.	19.35	.....
Jackson co. silv'r's 8 per cent.	21.40	21.90
Malleable Bessemer	17.50	17.50
Alabama basic	18.85	.....

Merchant Bars.—Bar iron is even stronger at 1.50c and hard steel bars are now quoted at 1.60c to 1.70c. The former is now the minimum price on this material and 1.70c has been obtained in a number of instances. The strength of hard steel is due largely to a scarcity of re-rolling rails. Soft steel bars are still quoted at 1.58c to 1.63c in this territory, but as the mills are full for almost a year to come, any quotations are largely nominal.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.50c to 1.55c, hard steel bars, rerolled, 1.60c to 1.70c; soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 60 per cent off list for carload lots, 55 per cent off for less than carloads.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.20c, full extras.

Structural Material.—A decreasing number of structural contracts continues to reflect the market for this material. It is understood that Corporation mills in this district are full for almost a year and the jobbers are short on some sizes. The bulk of the business taken by fabricators is made up of small contracts, requiring from 10 to 50 tons of structural material which can be obtained from store. Structural contracts let during the week amount to only 1,547 tons, of which the Llewellyn Iron Works has taken 215 tons from the state of California for the Exposition Park building, Los Angeles, and Christopher & Simpson have taken 430 tons from the Valier & Spies Milling Co., St. Louis, for a new mill building in that city. The Pacific Rolling Mill Co. has taken 595 tons for the Brockman building, Los Angeles, Cal., and the West Coast Steel Works has taken 107 tons for Central School building at Tacoma, Wash. A contract has also been let for 200 tons of structural material for the Rockford high school, Rockford, Ill.

We quote, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over 6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings.—Railroad buying in unprecedented quantities continues to tax the rail mills in this district. In both this material and track fastenings, it is expected that the leading interest will break all records for specifications during this month. No material price advances have been made, the leading interest adhering to previous quotations. Large orders placed recently include 5,000 tons of rails taken from the Illinois Central by the Illinois Steel Co., and 4,000 tons taken by the Maryland Steel Co. from the San Antonio & Aransas Pass. While the leading interest continues to take the bulk of the business, the local representatives of eastern mills are obtaining a fair share of small orders.

We quote, light rails, f. o. b. Chicago, and track fastenings, f. o. b. Joliet, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $24; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Joliet, angle bars 1.50c; railroad spikes, 1.90c; smaller size spikes, 1.70c base; track bolts with square nuts, 2.25c to 2.30c.

Plates.—There seems to be no indication of a cessation in car buying, although the builders' shops are crowded to capacity and many of the orders that are now being placed cannot be delivered until the second half of the coming year. It is said that the situation in finished lines and the accompanying difficulty of obtaining material, are delaying many purchases that otherwise would be made. The Pacific Fruit Express is in the

market for 2,000 refrigerator cars and the Elgin, Joliet & Eastern is in the market for 1,000 hopper cars. The Missouri, Kansas & Texas has ordered 28 passenger cars from the Pullman Co. The Chicago, Milwaukee & St. Paul will build 3,000 freight cars at the company's shops and is in the market for underframes, trucks and bolsters for this equipment. The Chicago, Burlington & Quincy also is in the market for five dining cars and 21 combination mail and baggage cars. The Chicago & Northwestern is closing contracts for 6,500 cars as follows: one thousand box cars, 1,000 all-steel hopper cars and 500 flat cars from the Pullman Co. and the 2,000 box cars and 2,000 gondola cars from the American Car & Foundry Co. The Canadian Pacific has split its order for 60 sleeping cars between the Pullman Co. and the Barney & Smith Car Co., each to build half of the order.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $2.05.

Bolts, Nuts and Rivets.—Advances have been made in the quotations on these products and the market is very firm. Any additional advances in finished lines will bring about a light movement on these materials. Heavy specifying continues and the question of delivery is becoming paramount.

Rivets

Structural rivets, ¾ to 1¼ inches, 2.08c to 2.18c. base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ⅝ x 6 inches, rolled thread, 75-10-2½; larger sizes, 70-5.

Machine bolts, up to ⅝ x 4 inches, rolled thread, 75-10-7½; cut thread 75-10-2½; larger sizes, 70-10.

Hot pressed nuts, square head, $5.80 off per cwt.; hexagon, $6.40 off per cwt.

Sheets.—One of the largest independent mills in this territory now has no unfilled capacity for the first quarter and has very little tonnage to offer for the second quarter. The high price of spelter is still affecting galvanized sheets and almost any price can be obtained on such business as can be placed. For this reason, mill prices in this territory are nominal.

We quote, f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.15c; No. 12, 2.20c. Box annealed, No. 28, 2.70c. Galvanized No. 28, 3.95c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—Although eastern independents continue to quote advanced prices to this territory, the leading interest is maintaining previous quotations, which, however, will probably be advanced before the end of the year. There is a heavy volume of specifications in all lines and a record-breaking year is expected.

We quote, f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93, retailers' less than carload lots, $1.98; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $1.98, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.68; retailers' carload lots, $1.73.

Merchant Pipe and Tubes.—The makers in this territory are still behind on deliveries in spite of strenuous efforts that have been made to overtake the demand. Specifications continue unabated and prices are very firm with a decided upward tendency. Additional advances are expected in some quarters before Jan. 1.

We quote store prices on merchant pipes and tubes as follows:

Iron and Steel Pipe Basing Prices.

	Steel. Black.	Steel. Galv.	Iron. Black.	Iron. Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch to 1½ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	73.2	64.2	67.2	57.2
4½ inch to 6 inch..	75.2	66.2	68.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.2	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch	60.2	48.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel. Per cent.	Charcoal iron. Per cent.	Shelby seamless. Per cent.
1 inch	37	..	55½
1¼ to 2¼ inch.....	53	38	34
2¾ to 3¼ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe.—There is no indication of immediate activity in cast iron pipe and the larger part of the business still consists of specifications for small lots. In view of the strong upward tendencies in pig iron, a number of large cities are considering coming into the market earlier than usual for their next year's requirements. These will be compiled during November and in December some heavy tonnages will probably be in the market. No changes in prices have been made.

We quote, f. o. b. Chicago, as follows:

Four-inch water pipe, $30, 6 to 12 inches, $28, larger sizes, $27; gas pipe, $1 a ton higher.

Old Material.—The price of scrap continues to decline and some items are 50c a ton below the prevailing price a week ago. Consumers' stocks have for some time been at a point where buying would be purely speculative and with high prices ruling, very little buying of this nature has been done. In spite of the quick break in the market, there has been no evidence of selling short on the part of dealers, as the size of their stocks precluded the possibility of entirely unloading them. While the shortage of cars and labor still tends to prevent any heavy movement of scrap by the railroads, the week has witnessed larger lists than have appeared for some time. The Rock Island has invited bids on 3,664 tons of mixed scrap, of which the principal items are 300 tons of No. 1 steel rails and 1,000 tons of No. 1 railroad wrought. The Great Northern has also issued a very heavy list on which bids were closed Monday, of which the principal item was 2,400 tons of steel rails.

We quote, for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$14.75 to 15.25
Old iron rails	17.00 to 17.50
Rerolling rails (5 ft. and over)	16.25 to 16.75
Old steel rails (3 ft. and und.)	14.50 to 15.00
Frogs, switches and guards	14.25 to 14.75
Heavy melting steel	13.75 to 14.25
Shoveling steel	14.00 to 14.50

Net Tons

No. 1 R. R. wrought	$13.50 to 14.00
No. 2 R. R. wrought	12.50 to 13.00
Arch bars and transoms	17.00 to 17.50
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.75 to 17.25
Iron car axles	21.50 to 22.00
Steel car axles	18.00 to 18.50
Locomotive tires	13.50 to 14.40
Dealers forge	11.25 to 11.75
Pipe and flues	10.75 to 11.25
No. 1 cast	14.00 to 14.50
No. 1 busheling	11.75 to 12.25
No. 2 busheling	8.75 to 9.25
No. 1 boiler cut	10.00 to 10.50
Boiler punchings	13.00 to 13.50
Cast and mixed boring	8.00 to 8.25
Machine shop turnings	8.75 to 9.25
Railroad malleable	13.75 to 14.25
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	12.75 to 13.25
Stove plate and light cast scrap	11.00 to 11.50

The Virginia Iron, Coal & Coke Co., Roanoke, Va., advises that it has no definite plans with regard to putting into operation its Crescent rolling mills and its Bristol blast furnace, both of Bristol, Va. It states that it is not likely that repairs on the Bristol blast furnace will begin before Dec. 1, or that the rolling mill will begin operations before next spring.

CLEVELAND

Record Breaking Ore Shipments

Office of THE IRON TRADE REVIEW,
Penton Bldg., Oct. 29.

Iron Ore.—It now seems assured that the shipments for October will exceed 7,000,000 tons, thus making the fifth month of the year when that tonnage has been moved. The movement to Oct. 1, 1912, was 36,338,382 tons, and with the movement of 43,000,500 tons up to Nov. 1, it seems certain that the shipments for the season will exceed 45,000,000 tons, and will probably be more than 46,000,000 tons. Some wild tonnage is being placed at an advance of 10 cents over the contract rate by the smaller shippers, but the larger shippers are paying the contract rate only for whatever outside tonnage they require. Some additional reservations of old range Bessemer have been made in an informal way, but very little interest is being shown in the market by the furnace operators. Representatives of the ore companies are doing all they can to discourage early buying and they would like very much to see buying postponed until after Jan. 1. Car shortage at Lake Erie ore docks is increasing.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $3.75; Mesabi Bessemer, $3.50; old range non-Bessemer, $3.00; Mesabi non-Bessemer, $2.85.

Pig Iron.—Some sales of pig iron have been made at $17, furnace, for delivery outside of the city and this is now apparently the bottom quotation. Cleveland melters are well supplied with iron and the market at present in this immediate vicinity is very quiet. Cleveland sellers believe that $17 is the minimum price in the valley, judging from their experience on competitive business. It is expected that there will soon be some important purchasing of basic. For delivery during the remainder of this year and the first half of next year, we quote as follows, delivered Cleveland:

No. 1 foundry	$17.50 to 18.00
No. 2 foundry	17.00 to 17.25
No. 2 southern	16.85 to 17.35
Bessemer	17.90
Lake Superior charcoal	19.10 to 19.75
Silveries, 8 per cent silicon	20.55 to 21.55

Coke.—The foundry market continues strong and $4, ovens, is the usual quotation for delivery during the first half of next year. For prompt delivery, $4.50 is asked. The car shortage continues and is causing increasing embarrassment in making deliveries. Prices are as follows:

Connellsville furnace coke, $3.75 to $4.00 for prompt delivery, and $2.75 to $3.00 on contract; Connellsville foundry coke, $4.00 to $4.50 for prompt, and $4.00 on contract.

Finished Material.—Some sellers report that the pressure for delivery is somewhat relieved. Whether this is due to the buyers becoming weary in urging deliveries, or can be accounted for by consumers receiving materials contracted for months ago, is not clear, but it seems probable that conditions will be somewhat relieved as the new year approaches. On shapes and plates, premiums are still being paid to eastern Pennsylvania makers for early delivery, but leading manufacturers in the Pittsburgh district adhere to their policy of not accepting premiums and have made no change in quotations. Eastern mills continue to quote 1.60c on sheared plates and 1.65c on universals at their plants for western shipment. One maker of shapes has quoted 1.65c at its mill and small tonnages have been shipped at this price to the central west. The warehouse business continues brisk at 1.95c for steel bars and 2.15c for shapes and plates. Jobbers are having a great deal of difficulty in keeping the warehouses stocked with some sizes of structural material.

Old Material.—The market is active with local and outside demand still vigorous. Buying is being done freely and dealers are disposing of a quantity of scrap. The inquiry for No. 1 cast is heavy and inquiries have been received from foundries, in cities east of this district, that have not secured cast scrap in this market for several years. This grade is scarce and it is expected that the increased prices being offered from eastern cities will further deplete the supply. No. 1 busheling is going freely to local rolling mills, which are purchasing whatever tonnages are offered them. Borings and turnings are active, being shipped out largely to the Pittsburgh district. Heavy melting steel is being sold in some quantity to mills in Pittsburgh, the valley and other districts. All other grades are in good demand. The Wheeling & Lake Erie railroad list closed Oct. 31. We quote, f. o. b. Cleveland, as follows:

Gross Tons.

Old iron rails	$17.75 to 18.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old steel rails (over 6 ft.)	16.00 to 16.25
Relaying rails	23.50 to 24.00
Old steel boiler plate	12.25 to 12.75
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	12.50 to 13.00
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	14.50 to 15.00
Country mixed steel	13.00 to 13.50
Bundled sheet scrap	11.50 to 12.00

Net Tons.

No. 1 R. R. wrought	$15.00 to 15.50
No. 1 busheling	12.75 to 13.25
No. 1 machine cast	13.25 to 13.75
No. 1 dealers' wrought	11.50 to 12.00
Machine shop turnings	9.00 to 9.25
Pipes and flues	11.50 to 12.00
Wrought drillings	9.00 to 9.25
Cast borings	8.75 to 9.25
Stove plate	10.50 to 11.00
Wrought iron piling plate	16.00 to 16.50
Wrought iron arch bars	17.00 to 17.50

HEAVY CAR ORDER

Placed by Pennsylvania Lines, Bringing Year's Total to 18,000.

An order for 5,000 freight cars, consisting of 4,000 box and 1,000 refrigerator cars, has been placed by the Pennsylvania railroad, of which 4,000 cars will be built by the Pressed Steel Car Co., and 1,000 cars in the railroad's shops at Altoona. This order brings the total of new cars ordered by the system in recent months to about 10,000, and with 8,000 cars purchased to replace old cars which have been scrapped, this brings the grand total of cars purchased this year to 18,000 at a cost of more than $20,000,000.

Weights of Soft Steel Sheets

The West Penn Steel Co., Brackenridge, Pa., has issued a booklet giving tables of weights of soft steel sheets and other information relating to the sheet business. The company states that the weights given in the table have been proven correct in actual practice. The following special notice is given:

"A square foot of soft steel No. 24-gage 0.025 weighs 1.02 pounds. Upon reference to the United States Standard of Gages and Weights, it will be seen that No. 24-gage is given as one pounnd per square foot. This standard was authorized by act of congress before the soft steel took the place of iron sheets, and has not been changed to meet present conditions."

CINCINNATI

Minimum Pig Iron Prices Disappearing

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Oct. 29.

Pig Iron.—The minimum quotation of $13.50, Birmingham basis, on southern No. 2 foundry pig iron, is showing a strong tendency to vanish, and while it is still somewhat in evidence for spot and last quarter iron, it will probably disappear by the end of the present week. This does not indicate a general advance on all makes, but simply means that those Tennessee furnaces which have been quoting at this lower figure for some time will be on the same basis as those quoting $14, in the Birmingham district. The market as a whole is very strong, and the tendency of all prices is towards a higher level. Some of the furnaces are beginning to take business through the second quarter of next year, but generally only on attractive tonnages, and, in most cases, are asking a dollar above their last quarter prices for this delivery.

An advance in price among the southern Ohio furnaces is being freely spoken of, but $16.50 to $17, Ironton basis, which cover shipments from the present time through the second quarter, are still the prevailing quotations. A sale on about 700 tons of northern foundry iron was made in northern Ohio during the latter part of last week, at $16.30, Ironton basis, but there were some special features connected with it. There are continual rumors of the above prices being battered, but, like the last mentioned sale, there are usually some good reasons why this is being done.

Resale iron in both the southern and southern Ohio districts, is rather scarce, and the little to be had is generally being held below market prices. There is not enough of it, though, to have any noticeable effect. The schedule for the Ashland furnaces shows that their price on 8 per cent silicon has been advanced to $19 for the last quarter of this year, $19.50 for the first quarter, and $20 for the second quarter of 1913, f. o. b. furnace. The Jackson, O., furnaces are practically out of the market, and are generally quoting above the regular selling prices.

We quote as follows:

Southern foundry No. 1	$17.25 to 18.00
Southern foundry No. 2	16.75 to 17.75
Southern foundry No. 3	16.25 to 16.75
Southern foundry No. 4	16.00 to 16.50
Southern gray forge	15.75 to 16.25
Mottled	15.25 to 15.75
Southern No. 1 soft	17.25 to 18.00
Southern No. 2 soft	16.75 to 17.75
Standard southern car wheel	25.75 to 26.25
Northern No. 2	17.70 to 18.20
Northern No. 3	17.20 to 17.70
Northern No. 4	16.95 to 17.45
Silveries 8 per cent silicon	20.20 to 21.20

Coke.—The coke market is wild and uncertain. The demand far exceeds the output, and users who have depended upon their contracts for their requirements are, in some cases, being seriously handicapped. Two furnaces in southern Ohio are ready to blow in, but cannot get enough coke on hand to do so, although it has been contracted for in both instances for some time. The coke business has practically settled down to carload lots, and mostly for spot shipment, as the ovens are selling as much spot coke as it is possible for them to do on account of the fancy prices it is bringing. Furnaces, also, as a general rule, are refusing to pay the contract prices asked at present, as they figure profits will be seriously affected, and are only buying supplies as they are needed. It is impossible for dealers to get quotations on certain makes of coke for certain deliveries. There is practically no Pocahontas coke of any kind to be had, the only sale from this district reported during the past week being 3,000 tons of furnace coke for November and December shipment at $3.65 a ton, ovens. Dealers, also, cannot give quotations on New River spot furnace or contract foundry coke. There is a very little spot Wise county furnace coke to be had at $3.25, and a little foundry at $3.75, ovens. A small sale of New River furnace coke was recently made on the sliding scale basis, which at present would be about $2.75, ovens. We quote below from the leading coke producing districts as follows:

	Prompt shipment.	Contract. second half.
Connellsville district:		
Foundry coke	$4.00 to 4.50	$3.75 to 4.00
Furnace coke	3.85 to 4.00	3.00 to 3.25
Wise county district:		
Foundry coke	$3.75 to 4.25	$3.50 to 4.00
Furnace coke	3.50 to 4.00	3.25 to 3.75
Pocahontas district:		
Foundry coke	$3.75 to 4.00	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00
New River:		
Foundry coke	$3.75 to 4.25	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00

Finished Material. — Although the local mill is still quoting 3.45c, Pittsburgh, on galvanized sheets No. 28 gage, it has been asking 3.50c on certain tonnages within the past week, but has closed no contracts of much importance at this latter figure. Black sheets, No. 28 gage, are being held at 2.30c, Pittsburgh basis. The local situation is strong, and orders covering the next eight to ten weeks have been booked.

Warehouse business remains good, and local houses are still finding it a hard matter to keep enough stock on hand to fill the demand. Prices have not changed during the past week and are as follows, f. o. b. Cincinnati:

Steel bars, 2c base; iron bars, 1.95c base; structurals, 2.10c base; plates, ¼ inch and over, 2.10c base; sheets, blue annealed, No. 10, 2.25c. base; rivets, cone head, 2.60c, base; cold rolled shafting, 58 per cent discount; steel hoops, 2.10c base, full extras; boiler tubes as follows: 1½ inch, 46 per cent discount; 1¾ to 2¼ inch, 57 per cent discount; 2½ inch, 60 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 68 per cent discount; 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.15c; ⅝ inch square and larger, 2.25c; ½ inch square and larger, 2.35c; ⅜ to ⅜ inch square and larger, 2.55c, and ¼ inch square and larger, 2.65c.

Old Material.—The scrap iron market has weakened, and while all prices have not been reduced, they are somewhat uncertain. Dealers are also showing a lack of confidence, and are, as a general rule, refusing to add to their stocks. Stove plate has been selling at about 50 cents a ton lower than last week, and is now given at from $9 to $9.50 per net ton, and heavy turnings are held at from $8.50 to $9 per net ton. Heavy melting scrap is weak at from $12.50 to $13.25 per gross ton. Indications do not point to a stiffening in prices before the end of the week, if then. We quote below prices dealers will pay and also dealers' selling prices in Cincinnati and vicinity as follows:

Gross Tons

Old iron rails	$14.50 to 15.00
Old steel rerolling	12.50 to 13.00
Old iron axles	19.00 to 19.50
Heavy melting scrap	12.50 to 13.25
Relaying rails	21.75 to 22.50
Bundled sheet scrap	9.75 to 10.25

Net Tons

Old No. 1 R. R. wrought	$12.00 to 12.50
No. 1 machinery cast	12.25 to 12.75
No. 1 busheling	10.50 to 11.00
Stove plate	9.00 to 9.50
Machine shop turnings	8.00 to 8.50
Cast borings	8.50 to 9.00
Heavy turnings	8.50 to 9.00
Mixed cast	11.00 to 11.50
Malleable	8.75 to 9.25

PHILADELPHIA

Strong Conditions Fully Maintained

Office of THE IRON TRADE REVIEW,
Philadelphia, Oct. 29.

A more moderate tone is shown on the market side of the eastern iron and steel industry. Due possibly to the near approach of the presidential election, trading as a whole is less active. There are no visible signs of any weakening, however, and in some directions further price advances are developing. The going market on plates and shapes in the east remains about 1.60c and prompt steel bars are commanding sharp premiums. Pig iron is quieter, but is still rising. Low phosphorus metal is particularly buoyant. Old material shows further advances. The open-hearth plant of the Maryland Steel Co., at Sparrows Point, resumed in the week. An important order just announced by the Pennsylvania railroad, calls for 5,000 cars.

Pig Iron.—The market has not the breadth or action to it that has recently been so marked, but the strength of conditions is being fully maintained and further advances, especially in the special irons, are developing. On standard eastern Pennsylvania No. 2X, prices have further firmed up, so that $18 to $18.50 delivered in Philadelphia and vicinity now represents the market. This is equivalent to $17.50 to $17.75 furnace. A fair aggregate of sales usually in lots of 500 tons or less is being made over this range of values. Central Pennsylvania makers are quoting from $17.25 to $17.50 furnace for No. 2X, or $19.10 delivered this district. Virginia No. 2X for this year and first half has been done in moderate lots at $16 furnace, or $18.80 this district. Several forward lots of standard mill forge for shipment in the immediate neighborhood of the furnace were sold at $17.50 furnace. Pipe forge along the Delaware river commands from $17.25 to $17.50. A round block of central Pennsylvania metal is reported as having been recently sold at $15.50, furnace, or $17.35, delivered. An eastern Pennsylvania pipe maker took 1,000 tons of pipe forge at $17.90, delivered. The market continues to hear reports of heavy blocks of Virginia low grade metal engaged by middlemen for sale to Delaware river pipe interests, but this lacks confirmation beyond the transaction of 9,000 tons reported last week. The Pennsylvania railroad has finally distributed orders against its inquiry for 5,200 tons of coke and charcoal iron for first quarter delivery at Altoona. There are no new developments in eastern basic. The highest price yet paid, as reported, was $17.25, furnace, done on a small lot for New Jersey delivery. The sale of 5,000 tons to central Pennsylvania done at $18.15, delivered, represented a $17 selling furnace. One eastern steel maker is inquiring for an additional lot of several thousand tons for first quarter. Eastern basic makers now ask from $18 to $18.25, delivered, for their metal. Low phosphorus iron has scaled another advance and $23.50, Philadelphia, is now quoted on standard metal. A lot of 500 tons sold on an outstanding quotation of $23, delivered, and off lots were bought around the same figure. A small lot of off-cast low phosphorus was done at $20, furnace. The Macungie, Pa., furnace, which was recently damaged by accident, has resumed on basic and the No. 1 Crane at Catasauqua will soon go in on low phosphorus.

We quote for prompt and last quarter shipment to consumers' plants in Philadelphia and vicinity as follows:

Eastern Pa. No. 1X foundry	$18.50 to 18.75
Eastern Pa. No. 2X foundry	18.00 to 18.50
Eastern Pa. No. 2 plain	17.50 to 18.00
Standard gray forge	17.25 to 17.50
Basic (Eastern and Central Pa.)	18.00 to 18.25
Virginia No. 2X	18.65 to 18.80
Southern No. 2	16.50 to 17.50
Malleable	18.75 to 19.00
Low phosphorus, Philadelphia	23.50

(First Quarter.)

Malleable	19.00 to 19.25
Basic	18.00 to 18.25
Eastern Pa. No. 2X foundry	18.00 to 18.50
Eastern Pa. No. 2X plain	17.50 to 18.00
Virginia No. 2X	18.65 to 18.80
Low phosphorus, Phila	23.50

Iron and Steel Bars.—Steel bars for quick shipment have been sold by eastern makers at 1.75c, Philadelphia, or 1.60c, Pittsburgh, and these sellers report they are advancing to 1.85c, Philadelphia. It is understood that one bar maker which is usually a free seller when conditions prevail as at present, is quoting 1.80c, Pittsburgh, for two weeks' delivery. The nominal price on steel bars by the large producers remains 1.40c, Pittsburgh, or 1.55c, Philadelphia, but it is impossible to get early deliveries on this level. Bar iron continues to steadily advance and is up about $2 in the past week so that 1.50c, eastern mill, or 1.67½c, Philadelphia, is now minimum with some makers asking 1.70c, mill. The Jones & Laughlin Steel Co. has taken 830 tons of concrete bars for the Panama canal.

We quote for delivery to consumer's plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.67½c to 1.77½c. Steel bars are quoted 1.75c to 1.85c and from store are quoted at 2.15c. Cut nails are quoted from $1.85 to $1.90, Philadelphia.

Plates and Shapes.—Where makers of plates are able to make reasonably prompt deliveries, they are freely obtaining contracts at 1.60c, Pittsburgh, or 1.75c, Philadelphia, for this year or first quarter and considerably higher prices are being paid as premiums for especially quick shipment. Leading eastern makers continue to hold sheared plates at 1.60c, and universals at 1.65c, Pittsburgh, but some of the smaller mills in the Pittsburgh district which have not booked heavily ahead are also selling on the 1.60c, Pittsburgh, basis for both universal and sheared for eastern delivery. Large plate makers continue to quote 1.50c, Pittsburgh, as their schedule, but they are so sold up that this price is practically nominal as far as early deliveries go. Eastern shape makers are quoting from 1.50c to 1.60c, Pittsburgh, but the 1.50c level is usually the schedule of those makers who cannot deliver before some months. The Norfolk & Western railroad, which has been negotiating for 5,000 tons of plates, shapes and bars for the construction of 500 gondola cars in its own shops, has placed this business, some of it with eastern mills, but the bulk of it with western Pennsylvania plants. Pittsburgh mills will furnish the 5,000 to 6,000 tons required for the new Grace steamship just contracted for from the Cramp shipyard.

We quote delivered to consumer's plants in Philadelphia and vicinity: Sheared steel plates, 1.65c to 1.75c; universal steel plates, 1.65c to 1.80c; structural shapes, 1.65c to 1.75c. Plates and shapes from store are quoted at 2.15c to 2.25c.

Sheets.—Eastern makers are so well booked that they are more independent on new business, but they continue to enter orders considerably

in excess of the regular Pittsburgh schedule in blue annealed material.

We quote for delivery to consumer's plants in Philadelphia and vicinity, No. 10 gage blue annealed sheets at from 1.85c to 1.95c.

Semi-Finished Steel. — The Maryland Steel Co. started two of its idle open hearth furnaces at its Sparrows Point plant the past week and has made sales of 5,000 to 10,000 tons of billets against this capacity, some to other steel producers. Eastern consumers of semi-finished steel now seem to be comfortably covered and the most acute shortage in rolling billets seems to exist in the Pittsburgh district. Forging billets continue to command high prices.

We quote delivered to consumer's plants in Philadelphia and vicinity 4 x 4-inch open-hearth rolling billets at $28.50 to $30.50 and forging billets at from $34.50 to $38.50.

Coke.—An eastern steel maker has closed a contract for a round tonnage monthly of Connellsville furnace coke for delivery over next year at $3, ovens. A sale of 2,000 tons monthly of mountain coke throughout next year at $2.75, ovens, equivalent to $2.35, Connellsville, is noted. Spot coke continues to command fancy prices. A lot of 2,000 tons of furnace coke was done at $4, ovens. It is reported that $4.50, Latrobe region, has been done. By-product furnace coke is selling at $4.50, eastern ovens. Some leading brands of foundry coke are held at $4.50, ovens, for prompt.

Old Material.—Several of the eastern steel works are again looking around for heavy melting steel and it is asserted by dealers that it is no longer possible to obtain $15.50, delivered, steel. Two consumers are now understood to have paid $16, delivered, on some quantities. The rerolling rail situation shows more strength owing to the fact that the Pennsylvania railroad recently disposed of a large part of a several years' accumulation, amounting to 10,000 tons or more, which it had held awaiting a $15 price along its lines. Part of the tonnage went as heavy steel and part for rerolling. Since then the market has been rising and a sale of 1,000 tons at $16.75, delivered, is noted. Small lots of iron rails have gone at $18.50, delivered. There is a good demand for wrought material and prices are firm. Borings and turnings are stronger, the former having been done at $11.50, delivered, and the latter at $12, delivered. Throughout the old material market shows a substantial degree of strength. We quote, gross tons, delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$18.50 to 19.00
Old steel rails (rerolling)	17.00 to 17.50
No. 1 heavy melting steel	15.95 to 16.00
Old car wheels	15.00 to 15.50
Old iron axles	24.00 to 25.00
Old steel axles	18.50 to 19.00
No. 1 railroad wrought	17.50 to 18.00
Wrought pipe	14.00 to 14.50
Cast borings	11.25 to 11.75
Machine shop turnings	11.50 to 12.00
Heavy cast	14.25 to 14.75
Malleable	13.25 to 13.50
Stove plate	11.00 to 11.50
No. 1 forge	14.00 to 14.25
Low phosphorus	19.00 to 19.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem Pa., Reading, Pa., and Roebling, N. J., $1.10 to Pottsville, Pa.; Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

The Philadelphia sales office of the Republic Iron & Steel Co. has been moved from room No. 612 Morris building to a new suite at 902 and 903, the same building.

NEW YORK

Pig Iron Sales Drop, But Market is Strong

Office of THE IRON TRADE REVIEW, 1115 West Street Bldg., Oct. 29.

Iron Ore.—The Greek steamer Orion has been chartered for a cargo of 4,600 tons of Spanish ore from Marbella, Spain, to Philadelphia, at 12s 9d. This charter represents the highest freight rate paid on iron ore from Spanish ports to the eastern coast of the United States in a period of 20 years and strikingly illustrates the soaring ocean freight conditions that at present are practically making prohibitive the importation of trans-Atlantic ore to this country. The expectation is expressed in the east that action upon lake ore prices for next season is not far distant and some leading miners of eastern domestic ores are now on the verge of putting out their next season's schedules.

Pig Iron.—Quietness in trading has spread more fully throughout the market during the past week and the volume of selling has dropped down to inconsequential proportions. In some quarters, the greater apathy of consumers is thought to be related to the close approach of the presidential election. However the market may be lacking in activity, it is not wanting in strength, as prices continue very firm and are still buoyant. Eastern Pennsylvania No. 2X for this year is generally held at a maximum of $17.50, furnace, for No. 2X, or $18.20, tidewater, and for first quarter and half, about 25 cents higher. A Jersey consumer took 500 tons of high silicon iron at $18.20, delivered, and another Jersey buyer 1,000 tons of No. 2X for second quarter at $18.30, delivered, equivalent in the latter case to about $17.25, furnace. Virginia iron continues at $16.00, furnace, for No. 2X for this year and first quarter, or $18.80, on docks, this district, but for second quarter the leading producers' schedule of $15.50, for No. 2X is unchanged. Small sales of Virginia No. 2X for first half are reported at $17.00, furnace. Buffalo iron is firm at $17.00 to $17.50, furnace, for No. 2X. A New York state maker has advanced from $17.00 to $17.50, furnace, for No. 2X for first half. The New England market continues from $19.00 to $19.50, delivered, for No. 2X. An eastern pipe maker is still negotiating for 3,500 tons of No. 2 plain and No. 3 for this district and for 3,000 to 4,000 tons of No. 2X and No. 2 plain for an up-state plant and a Connecticut consumer has closed for 1,000 tons of low grade iron. The New York Air Brake Co., which has been sounding out the market for some weeks on an indefinite quantity of high and low silicon and off malleable grades for second and third quarter, is credited by report with having closed for a round tonnage for Watervliet, N. Y., but authoritative details are lacking. Leading eastern malleable buyers who have been in the market for lots of this grade report they have covered around $15.75, and $15.80, valley furnace, one of them, an up-state consumer, as late as a week ago, on 3,000 to 5,000 tons for forward delivery. We quote for prompt and last quarter shipment at New York tidewater as follows:

Northern foundry No. 1	$18.45 to 18.70
Northern No. 2X foundry	18.00 to 18.45
Northern No. 2 plain	17.45 to 18.00
No. 2 Virginia	18.80
No. 2 southern foundry	18.25 to 18.50

Malleable	19.00 to 19.25
Gray forge	17.00 to 17.50

(First Quarter.)

Northern No. 2X foundry	$18.20 to 18.45
Northern 2 plain	18.00 to 18.20
No. 2X Virginia	18.80
No. 2 Southern	18.25 to 18.75

Ferro-Alloys.—A leading English maker of ferro-manganese has announced that if the Dardanelles are closed by the Turks in the present war situation, its principal source of manganese ore supply in Russia will be shut off, so that it will have trouble to make deliveries on contracts. It expects that it will be obliged to pro rate its output in such a contingency. All leading makers seem to be impressed with the possible effects of the war situation and few, if any, of them are now offering forward metal at the established price of $61.00, seaboard. Prompt ferro continues to sell at high prices. A fair amount of inquiry for 50 per cent ferro-silicon is current.

We quote standard English 80 per cent ferro-manganese at from $68 to $70, seaboard, for early shipment and at $61, seaboard, for delivery after Jan. 1 and 50 per cent ferro-silicon on contract at $75, Pittsburgh or Philadelphia for carloads, $74, for larger lots, and $73, for 600 tons or more. For this year, the 50 per cent ferro-silicon schedule is $2.50 less.

Plates.—Leading car builders are authority for the statement that they believe the surface has only been scratched by the present active buying movement in railroad equipment. The great problem facing the car builders and the railroads at present is where they will be able to get the steel to cover any expanded requirements, as they already have serious troubles in this direction. The New York central lines have distributed orders for 207 coach, box and dining cars, one of the largest contracts of its kind placed this year. The American Car & Foundry Co. receives 115 cars of this order, the Barney & Smith Car Co., 60, the Standard Steel Car Co., 25 and the Pullman Car Co., 7. The Delaware, Lackawanna & Western railroad is inquiring for 1,000 box cars, 500 gondolas, 500 hoppers and 200 refrigerators. It is reported that the Chesapeake & Ohio has closed for 4,000 cars. The going market on plates for assured deliveries this year and first quarter is now on a minimum of 1.60c, Pittsburgh. Premiums considerably higher for especially prompt delivery, premiums up to 2 cents Pittsburgh, are being paid. The active sellers at present are the eastern mills and those smaller Pittsburgh interests which have not sold themselves up. Most of the larger interests quoting 1.50c, are practically out of the market for first quarter and in many cases for first half.

We quote, delivered at New York tidewater on going business, for last quarter or first quarter, 1.76c, New York on sheared tank plates. Some makers are asking $1 higher for universal plates. Plates from store are quoted at 2.15c.

Shapes.—Bridge orders have been recently placed in the east on the basis of 3 cents per pound erected or $60 a ton. A level shows a substantial improvement in eastern fabricating prices, but some shops on the same work quoted up to $20 a ton higher. Most eastern shops are well filled and with advancing plain material prices are more independent. Some eastern makers are still quoting standard shapes at 1.50c, Pittsburgh, or 1.66c, New York, but cannot make deliveries under 10 to 12 weeks. Usually they do not care to close contracts for first quarter, but in cases where it has been done, 1.60c, Pittsburgh, or 1.76c, New York, is obtained.

Fabricated lettings in the east are more liberal. The American Bridge Co. has formally closed for five additional sections of subway extensions this city to require 23,000 tons and has also taken 1,100 tons for the New York Central Y. M. C. A., this city. Other awards include 1,600 tons for the Rivoli loft, East Forty-first street, to Milliken Bros., Inc.; 1,300 tons for the United Cigar Stores building, this city, to Levering & Gerrigues; 500 tons for bridges for the Maine Central and 100 tons for a bridge on the Baltimore division of the Pennsylvania railroad, to the Pennsylvania Steel Co.; 200 tons for four bridges on the Tyrone and northern Pennsylvania divisions to the Phoenix Bridge Co.; 200 tons for a Pennsylvania railroad pier shed, this city, with the Fort Pitt Bridge Works; 400 tons to Geo. A. Just Co., for additions to the Bernheimer & Schwartz brewery, this city; 550 tons to an independent shop for an addition to the Alberger Pump & Condenser Co., Newburgh, N. Y.; a 200-ton bridge at Ossining, N. Y., for the New York Central lines to L. F. Shoemaker & Co.

The New York Central has distributed 600 tons of repair work among other independent shops. Bids are in for an addition to the Rhinelander building, this city, 1,600 tons, and on 700 tons for the Marquard apartment, East Sixty-eighth street. The Robertson apartment, 179th street and Broadway, 800 tons; the Schiff apartment, 105th street and West End avenue, 1,000 tons, and a loft at 133 West Twenty-fifth street, are still pending. Plans will soon be out for the Midwest Realty Co. loft, West Thirty-third street, 12 stories; for the Freundshaft Society club house, Fifty-fourth street and Seventh avenue, 12 stories; for the Hasco Building Co. apartment, 562 to 568 West End avenue, 700 tons, and for the Carnegie Construction Co. apartment, 119th street and Amsterdam avenue, 800 tons. The Noelke-Richards Iron Works has 1,275 tons for the White Sulphur Springs hotel, White Sulphur Springs, W. Va.; the Lane Bridge Co., 200 tons for a building for the Knickerbocker Portland Cement Co., Hudson, N. Y., and 425 tons have gone to independent shops for repairs to the Sixth Avenue Elevated Line. It is now formally announced that the American Bridge Co. has the Mystic River bridge, Boston, 2,000 tons.

We quote for New York delivery as follows: Structural shapes, 1.66 to 1.76c. Structural shapes from store, 2.15c.

Iron and Steel Bars.—Eastern bar iron makers are now getting a good business and are steadily advancing their prices. For quick shipment, New Jersey mills and other eastern producers usually ask 1.60c, minimum, but 1.50c, mill, has been done on fair lots. Steel bars for quick shipment are bringing premiums of $6 to $8 a ton.

We quote for New York delivery, steel bars at 1.56c and common bars at 1.55c to 1.65c. Steel bars from store are quoted at 2 cents.

Rails and Track Material.—The Lehigh Valley railroad is now negotiating for its next year's requirements, amounting to 10,000 to 15,000 tons. The Interborough Rapid Transit Co. has the inquiry for 7,000 tons of rails for next year still open. The New Haven order is still pending.

Old Material.—The market in old material in this district shows much firmness, though the large eastern buyers of heavy steel are not very active at this moment. The dealers continue to bid actively for material and are offering higher prices in some cases than consumers. Heavy steel is now quoted at $15.50 to $16, delivered eastern Pennsylvania. Cast scrap is moving better and a sale of 400 tons at $12, New York, is noted. A sale of iron axles at $24, delivered eastern Pennsylvania, is also reported. We quote gross tons, prices New York dealers will pay at tidewater, as follows:

Old car wheels	$13.25 to 13.50
Old iron axles	22.00 to 22.50
Steel axles	16.50 to 17.00
Old steel shafting	15.50 to 15.75
No. 1 heavy melting steel	13.25 to 13.50
No. 1 R. R. wrought	15.00 to 15.50
Wrought pipe	12.00 to 12.25
Cast borings	8.25 to 8.50
Machine shop turnings	9.50 to 10.00
Heavy cast	11.50 to 11.75
R. R. malleable	11.75 to 12.00
Stove plate	9.25 to 9.50
Grate bars	8.25 to 8.50

BIRMINGHAM

Heavy Call for Delivery on Contracts

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Oct. 29.

Pig Iron.—The feature of the situation is the heavy call for delivery against contracts, and the interest being manifested in deliveries to cover the first half of next year. With the exception of 350 tons of No. 2 soft for shipment in the first quarter, recent sales have consisted of carloads and 100-ton lots for early delivery. The first lot mentioned is reported sold at $14.50 per ton at Birmingham, while for the spot requirements, $14 to $14.50 per ton at Birmingham has been received. It is noted that the available tonnage for prompt delivery is practically in the hands of one large merchant interest, and one producing company. This last reports an aggregate of some 40,000 tons sold in the month of October at $14 per ton Birmingham for No. 2 foundry. Of the inquiry pending, the most significant in definite form is for 1,600 tons of analysis iron for first half delivery. An inquiry for 600 tons of No. 2 foundry is also pending, where delivery over the first half is desired, but quotations so far made on either lot referred to have not been made public. It is not believed that order books for second quarter requirements will be formally opened until the later part of November, or until after all stock reports as of Oct. 1 are in hand; however, the November production will no doubt show a substantial increase over that for the present month, which will of course affect the several views in the matter of future deliveries. As reported two of the largest producers remain practically out of the market for any delivery; another has only a limited tonnage of certain grades to dispose of, and still another limits all commitments to a period of one month. In view of such conditions, the market price for advanced deliveries is not definitely known, but it is reasonably certain that no tonnage for prompt delivery can be had at lower figures than $14, at Birmingham, while $14.50 per ton is the market price for certain brands. We quote the market as quiet, with the schedule of prices below ruling for delivery prior to the commencing of the second quarter, per gross ton, f. o. b. cars at Birmingham furnaces, viz.:

For delivery during the remainder of this year and first quarter next:

No. 1 foundry	$14.50 to 15.00
No. 2 foundry	14.00 to 14.50
No. 3 foundry	13.50 to 14.00
No. 4 foundry	13.00 to 13.50
Gray forge	12.50 to 13.00
Mottled	12.00 to 12.50
Standard basic	13.50 to 14.00
Off basic	11.00 to 11.50
Standard charcoal	24.50 to 25.00

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

Cast Iron Pipe.—The lettings to producers reported for the week consist of 900 tons for San Pedro, Cal.; 600 tons for Los Angeles, Cal.; 800 tons for Weiser, Idaho, and 300 tons for Waco, Tex. In addition to this just mentioned, an attractive aggregate of smaller orders was placed, for which, a higher average price than quoted was received. For municipal requirements, the market is quoted firmly as follows, for water pipe, per net ton, f. o. b. cars here, viz.: 4-inch, $24.50; 6-inch and up, $22.50, with $1 per ton extra for gas pipe.

Old Material.—Dealers report this market as decidedly stronger, but without a change in quotations. Stocks are being assembled where practicable and a disposition to speculate is still apparent. The demand in the week was largely for carload quantities, with light cast and machinery grades principally required. The prices dealers continue to ask for their holdings are about as follows per gross ton, f. o. b. cars here, viz.:

Old iron axles (light)	$15.50 to 16.00
Old steel axles (light)	13.50 to 14.00
Old iron rails	13.00 to 14.00
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.50 to 11.00
No. 1 country	8.50 to 9.00
No. 2 country	7.50 to 8.00
No. 1 machinery	10.50 to 11.00
No. 1 steel	10.00 to 10.50
Tram car wheels	9.00 to 9.50
Standard car wheels	12.00 to 12.50
Light cast and stove plate	8.50 to 9.00

ST. LOUIS

Large Basic Inquiry Still Open

Office of THE IRON TRADE REVIEW,
St. Louis, Oct. 29.

Pig Iron.—Transactions in pig iron are quiet in the St. Louis territory, but prices are stiff and material is scarce. The most important item in the market recently was the inquiry for 10,000 to 15,000 tons of basic put out last week by one of the largest steel plants in St. Louis. While it is reported in some quarters that the deal was closed, THE IRON TRADE REVIEW was informed by a reliable authority today that the plant had not bought any iron because it had been unable to purchase it at what it considers a right price. Few inquiries are in the market, and all are for small amounts and spot shipment. One sale was made last week of 500 tons of northern for first half delivery and another for 500 tons of southern for some delivery. A St. Louis plant is asking today for prices on 300 tons of northern foundry for first half shipment. Northern iron is firm at $17.50, furnace, Chicago, for No. 2, and $17, f. o. b. Ironton. Prices on southern iron follow:

Southern No. 1	$18.25 to 19.25
Southern No. 2	17.75 to 18.75
Southern No. 3	17.50 to 18.50
Southern No. 4	17.25 to 18.25

Coke.—The coke situation is reduced to the usual run of small orders, with prices somewhat higher on Connellsville and Virginia grades. There is no large inquiry reported. Quotations follow:

We quote 72-hour Connellsville foundry grades, $4.50 for immediate shipment or delivery through the year; 48-hour Connellsville furnace, $4.00; best 72-hour Virginia foundry, $3.75 to $4.00; 48-hour Virginia furnace, $3.25 to $3.50. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material.—The market for scrap is rather quiet, with slight reduction in prices on several items. Everybody seems inclined to hold off scrap buying until after the presidential election. No lists will be put out for several days. Prices, which dealers are willing to pay f. o. b. St. Louis, follow:

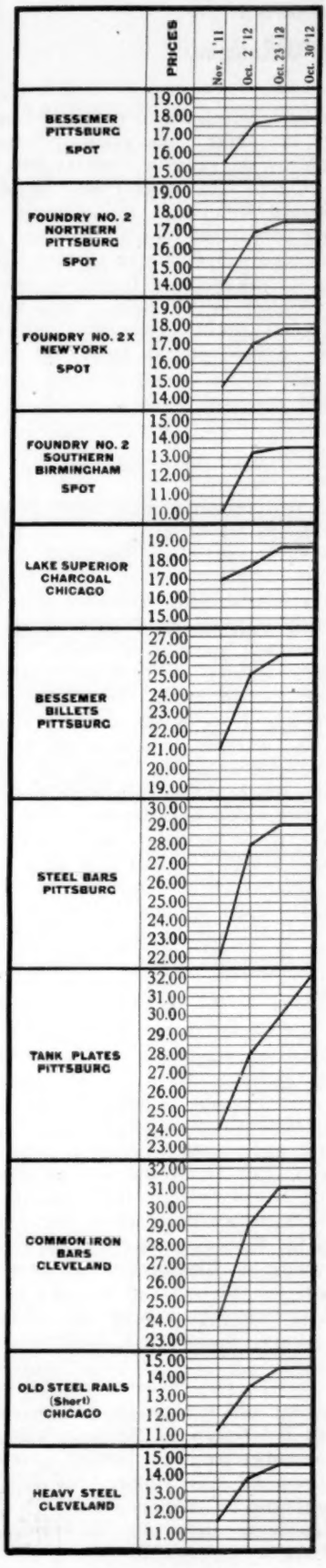
Gross Tons.

Old car wheels	$15.00 to 15.50
Old iron rails	15.50 to 16.00
Rerolling rails (5 ft. and over)	14.50 to 15.00
Old steel rails (3 ft. and und.)	14.00 to 14.50
Light section relayers (45 lbs. and under, subject to inspec.)	24.00 to 25.00
Relaying rails, subject to insp.	24.00 to 25.00
Frogs, switches and guards cut apart	14.00 to 14.50
Heavy melting steel	14.00 to 14.25
Shoveling steel	12.00 to 12.50

Net Tons.

No. 1 railroad wrought	$13.00 to 13.50
No. 2 railroad wrought	12.50 to 13.00
Arch bars and transoms	15.50 to 16.00
Knuckles, couplers and springs	12.50 to 12.75
Shafting	17.00 to 17.50
Iron car axles	20.00 to 21.00
Steel car axles	17.50 to 18.00
Locomotive tires	13.50 to 14.00
Pipes and flues	9.50 to 10.00
Tank iron and cut boilers	9.00 to 9.50
No. 1 cut busheling	11.00 to 11.50
No. 2 cut busheling	9.50 to 10.00
Cast and mixed borings	7.25 to 7.75
Machine shop turnings	8.75 to 9.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	10.50 to 11.00
Stove plates	10.00 to 10.50
Angle splice bars (iron)	13.50 to 14.00
Angle splice bars (steel)	12.50 to 12.75

PRICE CHART



METAL MARKETS

Copper Quiet—Foreign Tin Active

Chicago

Oct. 29.

New Metals.—The market for new metals continues firm, although there are but few changes in quotations. Spelter continues to lead and lead has fallen to 4.95c.

Lake copper, carload lots, 17⅝c; casting, 17½c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 7.50c; lead, desilverizing, 4.95c; sheet zinc, 9c, f. o. b. Lasalle, in car lots of 600-pound casks; pig tin, 50.12c; Cookson's antimony, 10⅛c; other grades, 9½c.

Old Metals.—Quotations on nonferrous scrap remain at about the same level and the market is rather firm. The demand continues good, brought about largely by constant increases in the business of the consumers.

We quote dealers' selling price, f. o. b. Chicago, as follows:

Copper wire, crucible shapes, 15¾c; copper bottoms, 14¾c; heavy red brass, 13½c; heavy yellow brass, 10c; No. 1 red brass borings, 12¼c; No. 1 yellow brass borings, 9¾c; brass clippings, 10c; lead pipe, 4⅝c; zinc scrap, 5¾c; tea lead, 4⅜c; No. 1 aluminum, 20c; No. 1 pewter, 36c; block tin pipe, 46c; tin foil, 42c; linotype dross, 3¼c; stereotype plates, 4¾c, stereotype dross, 5c; prime slab zinc dross, $112 a ton.

New York

Oct. 29.

Copper.—New business between leading producers and the consuming trade has been practically at a standstill the past week. Sellers have maintained their prices, and show confidence in a continuation of the present heavy consumption of copper, and ultimate resumption of buying at previous quotations. As represented by the sales of metal held by second hands and a few agencies the market for electrolytic is from 17.20c to 17.40c, compared with 17.62½c and 17.75c quoted by the leading sellers. Lake is nominally 17.50c to 18c, the outside figures being the quotation of the leading producer.

Tin.—The foreign standard market advanced to £232 for spot and £231 for three months, Oct. 28, on manipulation by the bull syndicate. Tuesday's cable disclosed some relaxation on the part of the controlling interests, however, and final prices are down about £2 from the previous closing. Due to the larger supply of metal that arrived during October, domestic sellers have offered tin under the foreign parity. In the local market spot tin ranged between 50c and 50.75c and November and December between 50c and 50.55c. On the New York metal exchange the final sales of today were made at 50c for November and December.

Arrivals since Oct. 1 aggregate 5,475 tons, and there are 1,180 tons affoat.

Lead.—Sales have been made in the west on the basis of 5c in New York, and some independent sellers are offering lead here at that figure. The American Smelting & Refining Co. and the United Metals Selling Co. continue to quote 5.10c for shipments to this territory, however.

Spelter.—The spelter market has displayed some weakness and the metal is offered at 10 points under last week's quotation. Prime western can be bought at 5.45c in New York.

Antimony.—The demand continues good and prices firm. Cookson's is 10.50c, Hallett's is 9.87½c, and Chinese and Hungarian are 9.75c.

Annual Meeting of Foundry & Machine Exhibition Co.

The annual meeting of the Foundry & Machine Exhibition Co., which conducts exhibits annually in connection with the conventions of the allied foundrymen's organizations, was held at the Fort Pitt hotel, Pittsburgh, Monday, Oct. 28. To further promote the educational work of the American Foundrymen's Association and the American Institute of Metals, the Exhibition company decided to pay from its treasury $500 to the former organization and $250 to the latter. Exhibitors at Buffalo were awarded a 15 per cent rebate upon the cost of the space occupied.

Officers for the ensuing year were elected as follows: President, F. N. Perkins, Arcade Mfg. Co., Freeport, Ill.; secretary, C. E. Hoyt, Lewis Institute, Chicago; treasurer, J. S. McCormick, J. S. McCormick Co., Pittsburgh.

A More Thorough System of Rail Inspection

Reported by Capt. Robert W. Hunt at the Meeting of the American Institute of Mining Engineers, and Which Has Been Adopted by 33 Railroads

With a program of 50 papers and a schedule of numerous trips to industrial plants, the 103d meeting of the American Institute of Mining Engineers, which opened at the Statler hotel, Cleveland, Tuesday morning, Oct. 29, promises to be one of the most notable gatherings yet held by this great organization. With few exceptions, the papers treat of the various phases of iron and steel practice, with blast furnace operations predominating. The registration approximates 150, and it is predicted that before adjournment on Thursday the attendance will be well above 200.

At the opening session, D. T. Croxton, chairman of the local executive committee, extended a formal welcome to the members of this society, and the official welcoming address was delivered by Mayor Newton D. Baker in his usual gracious manner. Reply was made by James F. Kemp, president of the Institute.

Inspection of Steel Rails

Capt. Robert W. Hunt, of Robert W. Hunt & Co., Chicago, discussed "Recent Developments in the Inspection of Steel Rails." He directed attention to a new system of inspection which has been inaugurated and which has been adopted by 33 railroad systems operating more than 122,000 miles of track. The method of inspecting rails is more thorough than the system heretofore followed, and provides for placing inspectors in each manufacturing department of the rail plants, who are on duty during all the working hours. From 12 to 15 inspectors are assigned to each rail mill, and it is their duty to observe carefully all of the manufacturing operations in the department of the works where they are on duty, and if any serious variations from the details of the specifications are noted, they are at once called to the attention of the foreman in charge of that department and a record is made of this fact. This deviation also is reported to the inspector of the succeeding department to which the ingot, bloom or rail would pass in the process of its manufacture. Care is exercised to have the rails correctly marked as to their heat numbers and respective location in the ingots from which they are rolled. The particulars of the inspectors' observations are reported in writing to the proper office of the purchaser, and in case of neglect of duty or bad work, the fact is given in writing to the official in charge of the works, thereby affording an opportunity for immediate investigation.

The engineering staff of every large railway system keeps a record of the results obtained from the rails used, and with such data as will be obtained from the plan adopted, it will be possible to trace the creative history of rails if they fail, or on the other hand, if they give satisfactory service.

The plan provides for placing men on day and night service in the steel producing departments of the blooming mill, rail mill and in charge of drop testing, while four to five men inspect the finished rails. Up to Oct. 1, 1912, more than 650,000 tons of rails, inspected in this way, have been shipped. Corps of inspectors have been detailed to all of the 15 rail mills in the United States and Canada, and the plan is working so satisfactorily that it will be adopted, without doubt, by other railroad systems. Capt. Hunt stated that this plan places the companies adopting it in the strong position of using their best efforts to protect the traveling public.

Amount of Discard

In the ensuing discussion, H. D. Hibbard requested information regarding the amount of discard. Capt. Hunt replied that no uniform practice in this respect is followed, but that usually it is 9 per cent. However, most of the contracts provide that the steel should be discarded until sound material is reached. Some of the railroads demand discards of from 20 to 25 per cent, but are compelled to pay higher prices than prevailing quotations for their rails. The Pennsylvania railroad stipulates that the top bloom be not used in the manufacture of its rails. At the present time, Capt. Hunt said, a discard of 33 1/3 per cent is being agitated. The guarantee of a life of five years is no longer demanded by the railroads.

Recently the Chicago, Milwaukee & St. Paul railroad placed an order for 10,000 tons of rails with the Illinois Steel Co. which are to contain 0.5 per cent of copper. The suggestion was made by the railroad company and it is believed that better results can be obtained with these rails, owing to their content of copper. The use of copper in rail steel was suggested by the success obtained from rails made from steel in which iron was used that was smelted from the Cornwall ores of Pennsylvania, which are well known to be copper-bearing. Capt. Hunt said that the steel rolled satisfactorily and was not red-short.

Alloy Steels for Rails

It was suggested that nickel or vanadium steel be used by railmakers, owing to the fact that such alloy steels withstand shock much better than carbon steel. Vibratory tests of nickel and vanadium steels used in automobile parts give results many times greater than those obtained from carbon steel. The latter will break at from 40,000 to 50,000 vibrations, whereas vanadium or nickel steel will withstand millions of vibrations before fracture. The prohibitory cost of nickel steel, however, will prevent its use for rails. Capt. Hunt was asked whether an inspector or a representative of the steel manufacturer passes upon the amount of discard. He replied that this is a delicate situation and added that it was not the inspector's duty to pass upon the amount of discard, but to note the failure on the part of the workmen to shear the ingot sufficiently to eliminate defective steel. With reference to the phosphorus limit, Capt. Hunt stated that it does not exceed 0.10 per cent, and averages probably 0.096 per cent. This he attributed to the diversion of rail orders to the open-hearth plants, which has relieved the strain on the Bessemer rail mills and consequently, on Bessemer ores. As a result, low phosphorus ores are more easily obtainable and recent tests show a lower phosphorus content than usual.

On Tuesday evening an informal smoker was held at the Statler hotel, and the feature of the entertainment was the moving pictures, entitled "From Mine to Molder," which were exhibited by Rogers, Brown & Co., Cincinnati, under the supervision of H. B. B. Yergason.

Benner Describes a General Market Upheaval

Telling How and Why Prices Tumble--Steel Corporation Hearings Resumed at Pittsburgh—Ore Men Will Testify

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg.

Pittsburgh, Oct. 29.—The hearings in the suit of the government for the dissolution of the United States Steel Corporation were resumed here today after an adjournment since Oct. 10. Today's witnesses were Henry Wick, formerly president of the Ohio Steel Co. and later vice president and chairman of the executive committee of the National Steel Co.; Henry Chalfant, president of Spang, Chalfant & Co.; Samuel Benner, former assistant to the president, Pittsburgh Steel Co., and B. S. Stephenson, formerly associate editor of THE IRON TRADE REVIEW and now manager of the Pittsburgh office of M. A. Hanna & Co.

Mr. Wick was president of the Ohio Steel Co. from 1892 to 1899. This company had an ingot capacity of about 1,600 to 2,000 tons per day, operating on an average of 250 days a year. It operated a blooming mill, two converters, a billet mill and a mill for producing sheet and tin bars. The Ohio Steel Co. was taken over by the National Steel Co. in 1899. Between that date and the formation of the United States Steel Corporation, in 1901, a rail mill and four blast furnaces were put in operation at the Ohio works. Judge Dickinson endeavored to have Mr. Wick admit that plans had also been gotten under way for the erection of an open-hearth steel plant at the Ohio works. The witness, however, said that he had no recollection of this. Counsel then produced a book of minutes of the Ohio works, in which it was moved that Julian Kennedy be instructed to proceed with plans for a new open-hearth plant. Mr. Wick, however, said he could not recall the adoption of this motion. The Ohio Steel Co.'s products were principally slabs, blooms, billets and sheet and tin bars. Later, the National Steel Co., in addition to these products, made rods and bars at its Mingo Junction plant. The competitors of the National Steel Co., Mr. Wick said, were principally the Carnegie Steel Co., the Federal Steel Co., the Jones & Laughlin Steel Co., the Pennsylvania Steel Co., the Bethlehem Steel Co., and the Illinois Steel Co.

Asked to explain the law of supply and demand which he had mentioned, Mr. Wick said that demand was what governed production. Judge Dickinson then asked the witness to explain how it was that at times when the market price of a steel product was changed, all the different concerns made the change simultaneously.

"Each company," said Mr. Wick, "took business at the best price it could. At times when the demand fell below production, the consumers would try and obtain their supplies at lower prices. The manufacturers, in order to keep their mills going, would accept orders at these prices and such sales, being reported to the other manufacturers, brought about a similar reduction in price on their part."

Mr. Wick said he did not recollect any instances in which prices were changed by agreement.

Judge Dickinson then endeavored to find out how many shares of National Steel Co. stock Mr. Wick had owned in 1901. This question was objected to by Mr. Lindabury on the ground that the judge is prying into Mr. Wick's private affairs. After a good-natured argument, in which everybody took part, Mr. Wick said he had no desire to withhold any information. To the best of his recollection, he said, he owned 1,000 shares or more.

Mr. Chalfant's Testimony

Henry Chalfant, president of Spang, Chalfant & Co., manufacturers of tubular goods, told about the meetings by manufacturers of lap-welded tubes, which were held at intervals between 1896-7 and 1906. Of this association, George Timmons, of Syracuse, N. Y., was secretary. The members attended luncheons and on these occasions Mr. Timmons would read reports showing the amount of business which had been taken by each manufacturer. Members who exceeded their percentage of allotment were required to pay in a certain sum.

E. C. Converse, said Mr. Chalfant, attended all these meetings until they came to an end in 1906. In cross-examination by David Reed Jr., however, Mr. Chalfant said that Mr. Converse was present at most of the later meetings merely for the social part of these affairs. Mr. Reed also wanted to know if the sums paid in by the manufacturers who had exceeded their allotments were not merely for the purpose of defraying the cost of the luncheons. The witness replied that they were considerably larger than was required for this purpose.

Samuel Benner was the next witness called. He testified regarding his connections with the sales department of the Carnegie Steel Co. prior to 1901. He said that he was in Europe for that company from April, 1898, until the middle of 1900. He then went to South America, remaining there until May, 1901. He said that during this time the Carnegie Steel Co. sold considerable amounts of billets and sheet bars abroad.

Mr. Benner was also asked by Judge Dickinson in regard to the meetings of the billet, bar and plate associations. Of these he named the various members, so far as he remembered them, saying that both he and Col. H. P. Bope attended for the Carnegie Steel Co. He said that the meetings would generally open with a discussion as to general conditions, amount of business taken, prices, etc. The members would then announce the prices which they would uphold. No agreements, however, were made, said Mr. Benner.

Mr. Benner said that a general upheaval of the market would result as a rule after one concern had taken a customer away from another. The latter would always take the ground that its competitor had secured the business by undercutting its price. The concern which thus considered itself as having been "robbed" would then retaliate by further cutting prices so as to take away customers from its competitor.

Most manufacturers had large stocks on hand when the panic occurred in 1907, said Mr. Benner. These were not consumed until six or eight months later. At that time, in the summer of 1908, a general price reduction of from $2.00 to $3.00 was made. In 1909, owing to a desire on the part of the manufacturers to get business, another substantial reduction was made. Judge Dickinson then produced a volume of THE IRON TRADE REVIEW for 1908 and questioned Mr. Benner regarding price changes which were set forth in the issue of June 11. These, Mr. Benner said, were the same as announced by Judge Gary at the time.

News Articles

B. S. Stephenson was questioned regarding a number of news items which appeared in THE IRON TRADE REVIEW during the years 1907 and 1908, when Mr. Stephenson was the associate editor of that paper in New York. The articles referred to had to do mainly with the so-called "Gary dinners" and the various committees which were appointed at these dinners. John A. Penton,

president of the Penton Publishing Co. and managing editor of THE IRON TRADE REVIEW, will be subpoenaed to testify further with regard to the sources of the data embodied in these articles.

Hearings in Cleveland

The hearings will be shifted from Pittsburgh to Cleveland, Thursday, Oct. 31, when the session will be held in the Federal building. Representatives of the following companies have been summoned to appear in Cleveland: M. A. Hanna & Co., Corrigan, McKinney & Co., Pickands, Mather & Co., Oglebay, Norton & Co., Tod-Stambaugh Co., of Cleveland, and the Republic Iron & Steel Co., of Youngstown. The companies will be asked to produce statements showing the quantity of iron ore shipped by mines owned, controlled or represented by them over the Duluth, Missabe & Northern railway and the Duluth & Iron Range railway during the year 1910, together with all contracts regarding the routing of the ore shipments.

HIGHEST PRICE

Paid for Foundry Coke in Five Years By a Central Western Consumer.

Pittsburgh, Oct. 30. (By wire.) — One of the leading sellers of foundry coke in this district this morning announced that about 150 cars of contract fuel were sold the last few days at $4, ovens, which is the highest figure obtained for five years. The coke involved in this sale will be shipped to a central western consumer. One dealer in close touch with the foundry coke situation estimates that about 75 per cent of the consumers in this district covered requirements to July 1, 1913, about a year ago, and the bulk of this tonnage sold as low at $2.40 to $2.60, ovens.

Locomotives Ordered

The Brazil railway has placed an order for eight Mallet compound superheater locomotives with the American Locomotive Co., and has also ordered 13 locomotives from the Lima Locomotive Corporation and eight from the Baldwin Locomotive Works. The Central railway of Peru has placed six superheater Mikado locomotives, the Cambria Steel Co. two six-wheel switching locomotives and the Keesville, Ausable Chasm & Lake Champlain railway one Mogul locomotive, all with the American Locomotive Co.

Electricians Strike.—Fifty-four electricians at the plant of the Sharon Steel Hoop Co., Sharon, Pa., went on strike last week for an advance of 2 cents an hour. After carrying on negotiations for several days, the officials of the company informed the electricians that they were no longer in its employ. The officials state that they were paying the highest wage rate now accorded to electricians and that they could not see why they should pay a premium.

STANDARD COMPANIES

Not Following Same Policy as to Selling Fuel Oil.

New York, Oct. 29. — Announcement that the Standard Oil Co. of Indiana has decided to discontinue the sale of fuel oil in the Milwaukee and Chicago districts effective Dec. 1, is not likely to have much effect upon the iron and steel industry in the eastern districts. The Standard Oil Co. of New Jersey has not followed the lead of the Standard Oil Co. of Indiana in this respect and contracts are now being made with consumers in the foundry and steel making trade for a year ahead. The price of fuel oil in the east is constantly advancing, due to the heavily increasing demand for the more refined and profitable products and some plants are finding it necessary to discontinue the use of this fuel. On the whole, however, the consumption of fuel oil by the foundries and steel plants in the east is increasing. The greatest demand for crude oil is coming from the crucible and other high grade manufacturing plants.

Gary Replies to Rumor

In reply to a rumor that the directors of the United States Steel Corporation are contemplating the segregation of the Corporation's subsidiary railroads, and possibly the Tennessee Coal, Iron & Railroad Co., with the object of removing complaints of the department of justice and the hope that the government's suit for the dissolution of the Corporation would be withdrawn, Judge Gary has made the following statement:

"Such action has not even been considered. The Corporation has always taken the stand that it has done nothing to violate the law and it seems unlikely that its directors would now take an action which might be held in certain quarters to be a confession of guilt."

REACHED HIGH MARK

Steel Corporation Statement of Earnings in Last Quarter.

The following statement of the earnings of the United States Steel Corporation for the quarter ending Sept. 30, has been made, showing they reached the high mark of the year:

Total earnings	$30,063,512
Less, charges	9,286,047
Net income	$20,777,465
Interest	5,683,964
Balance	$15,093,501
Dividends	12,658,700
Surplus	$2,434,801
Unfilled orders on hand, Sept. 30, tons.	6,551,507

Increasing Demand for Pipe

Pittsburgh, Oct. 30, (By wire.) — Several pipe consumers in this district are attempting to close negotiations before it comes too cold to lay lines. This morning, an inquiry for 12 miles of 6-inch line pipe for western shipment was received by a pipe manufacturer. Some pipe mills are out of the market for the remainder of the year. Shipments are being urged and complaint is heard because of the inability of the mills to make anything like the deliveries demanded.

Acquire Idle Furnace

The old J. & R. Meily blast furnace at Lebanon, Pa., which has been idle since June 1, 1910, has been purchased by a newly organized corporation, the Lebanon Blast Furnace Co., capitalized at $200,000 under the laws of the state of Pennsylvania. The incorporators are, E. G. Rust, Geo. E. Meiley and J. M. Shenk. The furnace is now being relined and generally repaired and is expected to be blown in not later than Jan. 1, 1913. No permanent improvements are contemplated at this time. The furnace was originally built in 1861 and remodeled in 1884 and 1904. It has an annual capacity of about 24,000 tons.

Approached on Combine

Charles M. Schwab, president of the Bethlehem Steel Corporation, upon his return from Europe last week, admitted he had been approached by a certain person with a view to entering a combination with some other independent steel companies, a project which has been revived recently in the columns of the daily press. Mr. Schwab stated, however, that he had as yet given no answer to this proposition, but was still considering the matter. Mr. Schwab said he expected to return to Europe very shortly on a business trip of much importance, details of which he was not yet in a position to divulge.

The Use of Mayari Iron in Foundry Mixtures[1]

Wonderful Results Obtained by the Use of Pig Iron Made From Cuban Ore, in the Production of Close-Grained and Chilled Gray Iron Sections

By Quincy Bent

The Mayari iron ore deposits of Cuba have furnished a wide scope for experimental work in the manufacturing processes of both iron and steel products. The ore is rather unlike any other iron-bearing mineral in common use. A serpentine rock, decomposed by the action of salt, water and heat, leaves on the plateau a bed of soft ore ranging from 12 to 30 feet in depth. The ore is quite uniform in analysis, with the exception of a slight variation in nickel content, and in the amount of silica and alumina; careful mining, however, produces a practically constant ore.

FIG. 1—FRACTURE OF MAYARI PIG IRON

An analysis of the natural ore follows: Fe, natural, 36.5 per cent; Fe, dry, 50.34 per cent; Si O_2, 3.75 per cent; $Al_2 O_3$, 10 per cent; phosphorus, 0.01 per cent; sulphur, 0.18 per cent; moisture, 27.50 per cent; combined H_2O, 10.50 per cent; manganese, 0.64 per cent; chromium, 1.40 per cent, and nickel and cobalt, 0.72 per cent.

The ore in its natural condition is very similar to a loose clay, lacking, however, its plasticity. We have used this raw ore in all proportions up to 75 per cent, but better results have been so far obtained from a treated material.

Nodulizing, briquetting and sintering are all available processes for preparing the ore in desirable forms. The first of these is the method at present most largely employed, recommending itself to us on account of our previous experience with it in the preparation of Cornwall concentrates. The nodulizing kilns are 125 feet long, 10 inches in diameter, and have a capacity of about eight tons of finished product per hour.

Powdered coal is used as a fuel, about 400 pounds being required to produce a ton of the iron nodules.

These nodules analyze as follows: Fe, natural, 53.5 per cent; Fe, dry, 54.9 per cent; Si O_2, 4 per cent; $Al_2 O_3$, 13 per cent; phosphorus, 0.015 per cent; sulphur, 0.18 per cent; moisture, 2.50 per cent; manganese, 0.85 per cent; chromium, 2.10 per cent, and nickel and cobalt, 0.95 per cent.

A typical sizing test yields these remainders on screens:

Inch.	Per cent.
¾	4.25
½	4.75
¼	7.50
⅛	13.75
Mesh.	
10	9.00
20	29.50
30	12.25
40	7.50
60	6.75
80	2.00
100	1.50
Through 100	1.25

They are easy to handle in grab buckets, bins and chutes, and do not carry enough moisture to give trouble in cold weather and are well suited to blast furnace requirements.

The briquetting of Mayari ore has presented unique difficulties; in handling the material its sticky quality makes it difficult to fill molds and to free the chutes and dies. It also has a peculiar quality of preventing the progress of heat through its mass. Bricks of small dimensions may be thoroughly fused on the surface, yet they are practically unaffected at the center.

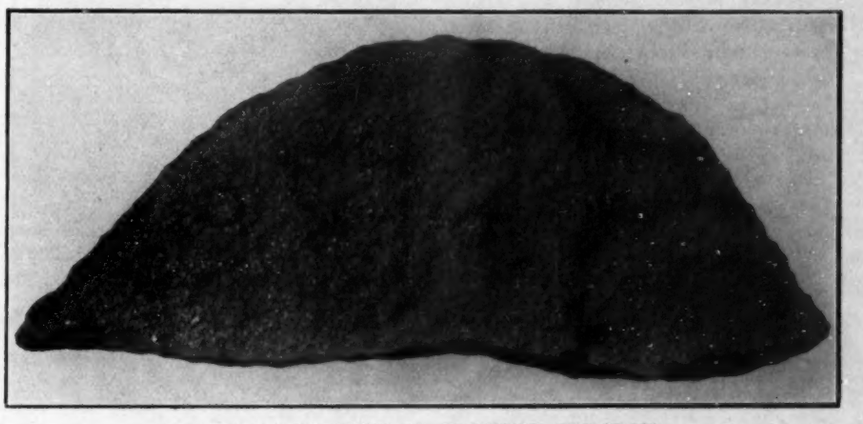


FIG. 2—FRACTURE OF FOUNDRY PIG IRON

Sintering is successful with Mayari ore and probably will be found ultimately to be more satisfactory than

[1]Presented at the Pittsburgh meeting of the American Iron and Steel Institute.

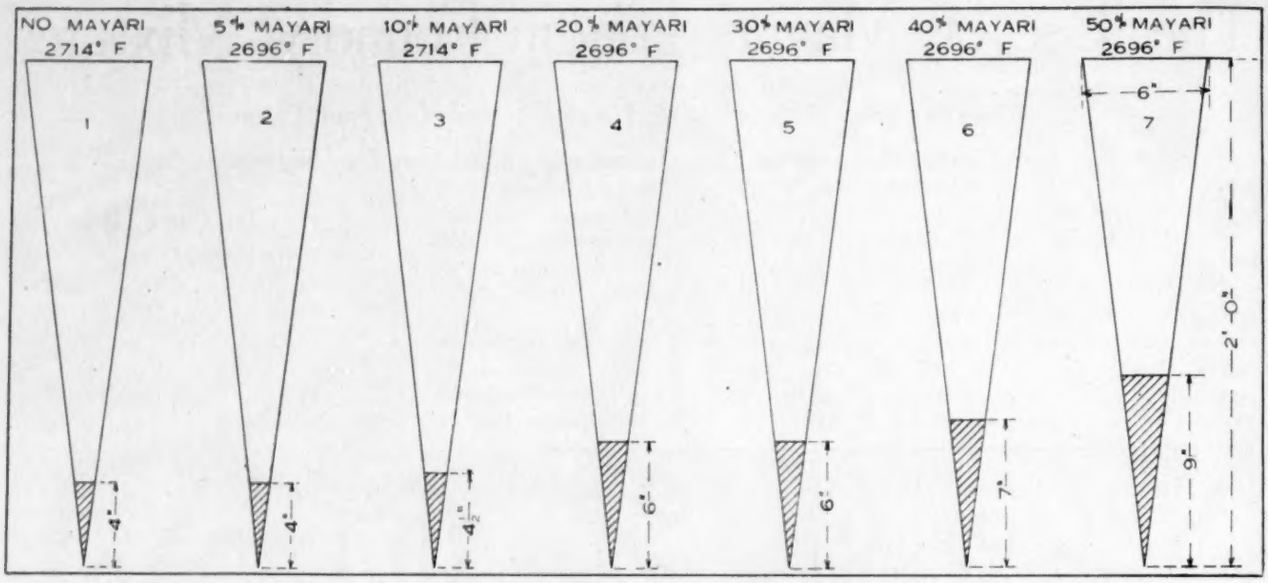


FIG. 3—WEDGE TESTS MADE FROM SEVEN EXPERIMENTAL HEATS USING DIFFERENT PERCENTAGES OF MAYARI IRON; THE SHADED PORTIONS SHOW AREAS OF EQUAL SIZE OF GRAIN

nodulizing. Its advantages are the smaller amount of fuel required, and the more open and porous character of the material produced.

The first problem that confronts the furnace operator is perhaps the burden of 75 to 100 per cent of nodulized material. Experiments made five to seven years ago, on nodules from Cornwall concentrates, proved conclusively that nodules need involve no insurmountable difficulties. The furnace seldom slipped, made a minimum of flue dirt (2½ per cent), evidenced no marked increase of blast pressure, and produced a good daily output on a fuel ratio of about 1 to 1. Considering the results of these experiments, both from the furnace experience and from our knowledge of nodulizing, it was decided to put Mayari ore into the form of nodules. As the nodules contain 54.9 per cent iron, 4 per cent silica and 13 per cent alumina, a few minutes' calculation will convince the metallurgist that no ordinary blast furnace slag equation is before him. Artificial mixtures, using bauxite as the alumina-bearing material, were made up. The chemistry of the ore was imitated and a blast furnace was run on it for several weeks.

A general impression seemed to prevail that somewhere above the 20 per cent Al_2O_3 mark was a range of dangerous territory in furnace slags. We have found little to fear in all of the scale of Al_2O_3 content from 10 to 32 per cent, our fluxing guide being SiO_2 plus Al_2O_3 to CaO plus MgO, regarding the Al_2O_3 as an acid.

We have operated furnaces with all percentages of nodulized Mayari ore and have made continuous runs for months with 100 per cent of it on the furnaces. The furnaces very seldom slip or hang. They do have a tendency to high pressure, and consequently slow driving, which I believe is due to the chemistry of the gangue before it fuses with the flux, an operation which takes place rather high up in the furnace bosh. The quality of the iron produced is extremely regular and the fuel ratio is good. A peculiar feature of this iron is its low silicon, due to the lack of SiO_2 in the furnace and to its desire to make as respectable a showing as possible in the slag rather than to be reduced. Typical analyses of irons and slags on 50 per cent Mayari, 50 per cent Cuban hard ore, and 100 per cent Mayari are given in Table I.

FIG. 4—FRACTURE OF CHILLED MAYARI PIG METAL

As far as we can learn from comparative observations, the temperature of the hearth, and consequently of the iron and slag, is somewhat higher than that of the normal blast furnace on Bessemer iron. This impression would seem to be substantiated by the fact that there is a reduction of TiO_2 taking place within the furnace, throwing a percentage of titanium into the iron, varying with the amount of silicon present. The following table shows this relation:

Silicon, per cent.	Titanium, per cent.
0.22	0.05
0.47	0.15
0.80	0.18
1.50	0.25
1.80	0.30

This Mayari pig iron has a large crystalline structure somewhat similar to spiegel, is hard and brittle, cannot be drilled and breaks up considerably when handled. The fracture is, of course, influenced by the rate of cooling, but even sand cast pigs have very little of the granular structure, unless the silicon is abnormally high. The iron runs freely, leaves little skull in the ladles, and has a clean, sharp cut surface.

Another peculiarity of this iron is the high total carbon content and the high ratio of combined to graphitic carbon, this ratio depending upon the rate of cooling, but in our iron the chromium seems to have the tendency of combining the carbon and prohibiting the formation of graphitic carbon.

Use of Mayari Iron in Castings

In the early days of production of Mayari pig iron, it was thought that its only use would be in the manufacture of steel, its inherent qualities prohibiting its use as an iron. A certain element of fortune, however, led us to discover our mistake. A portion of our blast furnace iron was

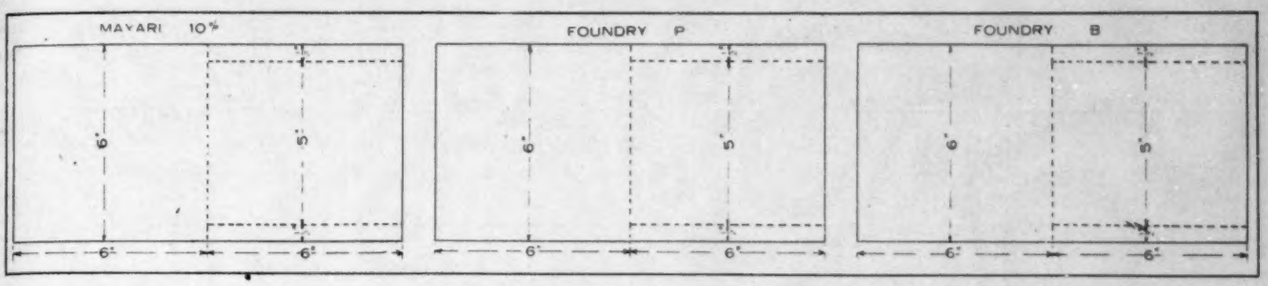


FIG. 5—RESULTS OF MACHINING TESTS

Average hardness (six specimens) Brinell	200	54	102
Average power required to machine off 6 in. in length with ½-in. cut	3.20 H. P.	2.43 H. P.	2.73 H. P.

TESTS ON ARBITRATION BARS CAST ACCORDING TO A. S. T. M. STANDARD

Tensile test (average of 30 tests)	29,940 lbs. per sq. in.	21,050 lbs. per sq. in.	20,750 lbs. per sq. in.
Transverse test (average of 30 tests)	3,620 lbs.	3,220 lbs.	3,112 lbs.
Deflection test (average of 30 tests)	10/32 in.	10/32 in.	10/32 in.
Graphitic carbon	2.54	2.57	2.55
Combined carbon.	0.66	0.74	0.65
Total carbon	3.20	3.31	3.18
Silicon	1.38	2.01	2.42
Manganese	0.52	0.49	0.41
Phosphorus	0.469	0.595	0.755
Sulphur	0.107	0.086	0.108
Chromium	0.42		
Nickel	0.29		

Conclusions: Brinell hardness of Mayari, 270 per cent greater than foundry "P"; and 66.67 per cent greater than foundry B; power required to machine Mayari, 31.68 per cent greater than foundry "P"; and 17.22 per cent greater than foundry "B"; tensile strength of Mayari, 42.23 per cent greater than foundry "P"; and 44.29 per cent greater than foundry "B"; transverse strength of Mayari, 12.42 per cent greater than foundry "P"; and 16.32 per cent greater than foundry "B".

taken direct each day to the foundry and as the Mayari burden was put on the furnaces some of this mixture found its way into our foundry metal. In it we noticed several peculiar qualities, namely, the smooth appearance of the surface, the closeness of the grain structure, the thin, sharp edges, and withal the strength which the fins on the castings seemed to possess.

These features led to experiments in crucible mixtures, which in turn brought us to use the metal in our general foundry practice. In the meantime, the content of nickel and chromium in the iron attracted the attention of other iron users and we began to hear of surprising results from certain foundries manufacturing pipe balls, guides, etc. A little later the roll manufacturers, who had been experimenting with chrome nickel alloys, undertook the problem of using it in their mixtures. While all this was taking place, we were working in our foundry, changing the proportions of the mixture to get certain results. From our machine shops came favorable comments upon the machining qualities of the iron and the nature of the resulting surfaces. Several times we have gone off the mixture entirely to assure ourselves that it was the Mayari iron and not some other element that had caused the change, but each time the same results appeared.

Our first inquiry introduces us to the effects of Mayari iron (and by Mayari iron I mean an iron containing

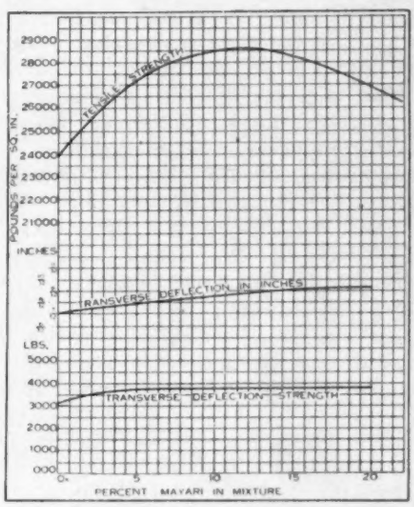


FIG. 6—TESTS MADE ON ARBITRATION BARS

2 to 2.50 per cent chromium and 1 to 1.25 per cent nickel, the chromium being always approximately double the nickel) in varying percentages on the grain of ordinary foundry mixtures. Wedge-shaped pieces, 6 inches at the base, tapering to a point in 2 feet of length, were cast in green sand, great care being taken as to the moisture of the molds and their compactness; also as to the temperature of the iron mixture. These specimens were split open and the fracture examined under the microscope; a unit grain size was arbitrarily chosen and its position located in each of the castings. From these locations of unit grains, as measured from the point, we can distinguish the difference in grain structure due to the presence of Mayari iron. For convenience and contrast, the specimens are arranged according to content of nickel and chromium and the curve of uniform grain marks the closing effect of the Mayari additions. These wedge tests are shown in Fig. 3.

Close Grain

The closing of the grain of a foundry mixture is so intimately related to its chilling characteristics that our next test was made with chilled blocks from the same mixture percentages, and care again was taken to have approximately the same pouring temperature. These blocks were cast in green sand against a 2-inch chill. The blocks were 4 x 4 x 6 inches. The chill depth was accurately measured under the microscope and hardness tests were made on the chill surface and also down the face of the fracture. The depth of chill shows plainly the influence of the Mayari addition, as does also the hardness test on the chilled surface. On the

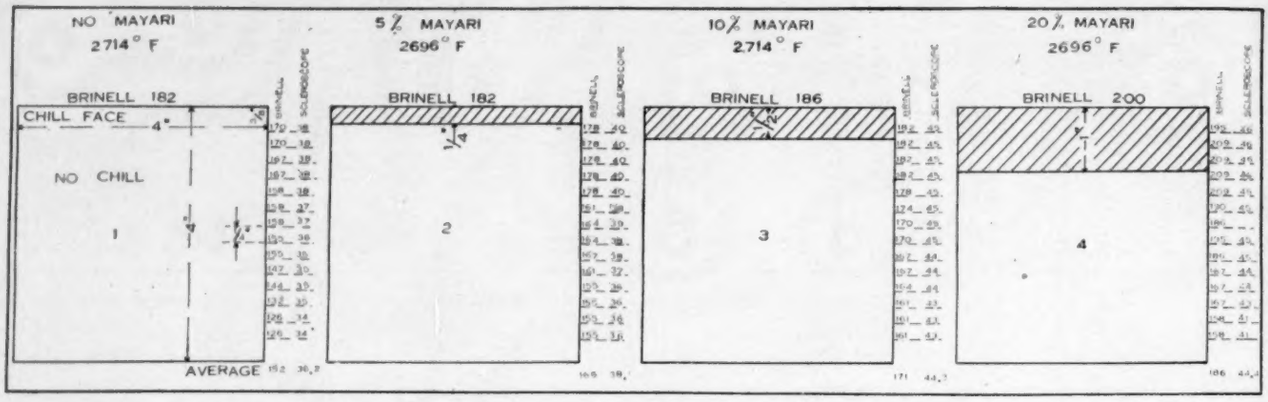


FIG. 7—RESULTS OF CHILL AND HARDNESS TESTS WITH VARYING PERCENTAGES OF MAYARI IRON

face of the fracture any unit of hardness may be taken and a curve of uniform hardness illustrates effectively these results. Figs. 7 and 8 graphically show the results of the chill and hardness tests.

Having discovered the ability of Mayari iron to produce a close grain and also a chilling mixture, we naturally turned to the influence which it might have on the strength of the casting as evidenced by the tensile and transverse tests. A diagram showing these curves is illustrated in Fig. 6. The figures are the average of several hundred tests, all made according to the method prescribed by the American Society for Testing Materials. The bars were cast from our regular foundry melts in actual practice.

The diagram shows a rise in tensile until the crux is reached and then a decline as further additions are made. The same rise is apparent in the transverse strength and at approximately the same point in the scale, although there is a second rise after the Mayari percentage passes 20; this, however, is not shown on the diagram.

From the foregoing data, it is quite evident that about 10 per cent would be a fair addition for general foundry work, increasing the amount as emphasis is to be laid on closeness of grain or chill.

Table II gives the results of our foundry practice for several months and also for a period when we omitted the Mayari iron to see the change in figures and to check the accuracy of our opinion that the Mayari addition was beneficial.

Machining Qualities

So far, I have not considered one very important feature, namely, the machining characteristics of the mixture. To demonstrate this, we had cast by two outside foundries, well-known in the general machinery trade, solid cylinders 12 inches long and 6 inches diameter. These were cast in green sand and were made of their heavy casting mixture. Arbitration test bars were also cast at the same time, 6 cylinders and 36 bars having been received from each foundry. These cylinders were placed in a lathe and the power accurately measured per unit of machine work. I will not go into the details of the test, but suffice it to say that the tool was sharpened after each test; the cutting speeds were the same, and hardness tests were made on all surfaces. The results of these machining tests are given in Fig. 5.

An increase in the power required to machine the Mayari casting is shown, but this increase is not in proportion to the increased strength or hardness. As a matter of fact, a careful canvass of the machinists engaged in every-day machining of Mayari castings developed the reply, "I have noticed no difference between the different castings that come to me." There, of course, is a difference; a close inspection of the tools showed this on our tests, but it is not great, or piecework men would certainly have brought it to our attention.

To further check the machining qualities of Mayari foundry mixtures specimens of heavy casting iron and Mayari iron were placed in a drill press and drilled; the power required again was measured accurately under identical conditions. Four holes, 6 inches deep, were drilled into each specimen with a 1¼-inch drill, with the following results: Horsepower required, Mayari foundry iron, 3.04; foundry iron "P," 2.27, and foundry iron "B," 2.36. The power required to drill Mayari foundry iron was 33.92 per cent greater than for foundry iron "P," and 28.81 per cent greater than that required for foundry iron "B."

Lack of time has prevented our in-

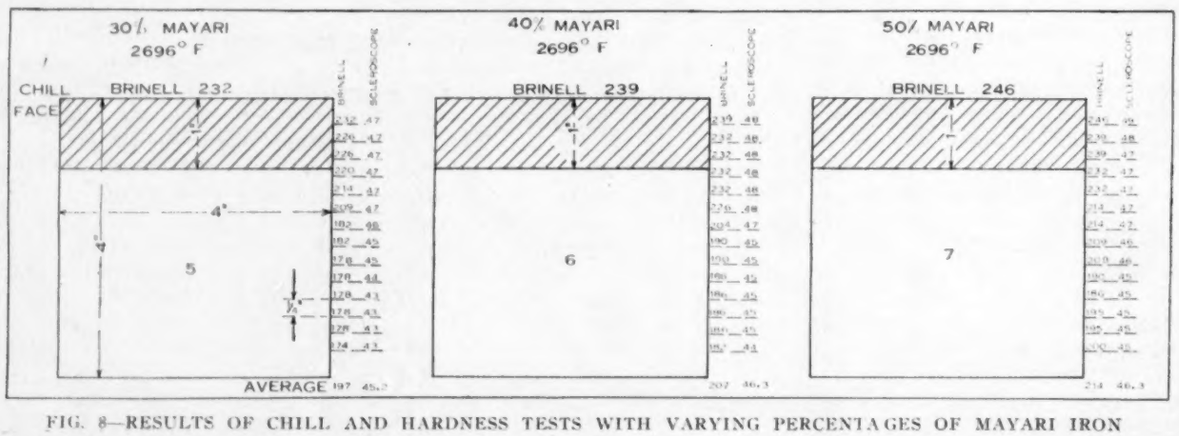


FIG. 8—RESULTS OF CHILL AND HARDNESS TESTS WITH VARYING PERCENTAGES OF MAYARI IRON

vestigations as to these relative machining qualities as the size of the casting is increased. Our belief is that as the mass increases less difference will appear. This theory is borne out by 15 subsequent experiments which are not recorded in this paper, but the average difference in these instances was 11.6 per cent.

Our natural deduction from these experiments is not to recommend the iron for all purposes, but for castings where closeness of grain, chill, strength or service is an essential.

The qualities of the iron developed in mixtures, as indicated by the foregoing tests, have led me to divide its uses into three classes of castings: All-chilled, green sand or semi-chilled and dry sand. Under the first head are rolls, guides, crusher plates, wearing plates, die blocks, car wheels, and all other castings requiring a hard surface for resistance to wear. The amount of Mayari iron to be used depends entirely upon the depth of chill required and the severity of the service to which the castings are to be subjected. Ordinary uses range within 15 to 40 per cent limits. Our experience with rolls has been most satisfactory, both as to increased life and as to strength and quality of surface. Rolls for both hot and cold work have shown that we can expect an increase from 25 to 50 per cent in life. Guides have given as high as 100 per cent increase in service, while reports as to crusher plates, etc., have compared quite favorably with manganese steel.

For green sand work where also a hard surface is required, yet where machine work must be done, leaving a fair and uniform surface of close texture, Mayari iron has given most excellent results. Some of these uses are sand rolls, pipe balls, bending dies, valve bodies, piston rings and shear blades, the percentage of Mayari being from 10 to 30 in these mixtures. Under dry sand castings are included sections requiring a fine finish, or a machined wearing surface involving both strength and closeness of grain, such as engine cylinders, valves, guides, slides, etc. This class of casting requires a Mayari addition of 8 to 15 per cent. For all of the above classes, we have found it desirable to keep the phosphorus in the mixture about 0.5 per cent.

We believe that Mayari iron accomplishes all that can be gained by the addition of cold blast charcoal iron, with better results as far as wearing surface is concerned. It is superior to any steel additions, inasmuch as its shrinkage and contraction are normal as compared with ordinary foundry iron. It does not gain its strength by a decrease in carbon content, as in semi-steel, and finally, it does not have the tendency to chill locally, due to cold or wet spots in the mold. The nickel and chromium do not segregate, either in iron or steel. The nickel seems to have counteracting effect upon the chromium as far as brittleness is concerned. A little loss is encountered in the chromium percentage as the mixture passes through a cupola, but the nickel remains unaffected.

Fluidity of the Iron

It is our belief that fluidity of the foundry iron is a little increased; the metal is very clean and a reduction in our defective castings has resulted. There is present in the iron a small percentage of vanadium and some titanium; how much these elements influence the results of our tests is a matter of conjecture. One would naturally attribute the iron's qualities to chromium and nickel. That our ratio, two parts of chromium to one part of nickel, is the right relation for all purposes is hardly conceivable; only experience can develop all of the changes within the range of possibility.

Table I.

TYPICAL ANALYSES OF IRONS AND SLAGS.

Irons, 50 Per Cent Mayari and 50 Per Cent Cuban Hard Ore.

Silicon, per cent.	Phosphorus, per cent.	Sulphur, per cent.	Manganese, per cent.	Chromium, per cent.	Nickel, per cent.
0.47	0.049	0.020	0.70	1.82	0.76
0.21	0.050	0.031	0.57	1.66	0.77
0.55	0.051	0.056	0.69	1.68	0.77
0.44	0.049	0.028	0.62	1.77	0.75

Slags, 50 Per Cent Mayari and 50 Per Cent Cuban Hard Ore.

SiO_2, per cent.	Al_2O_3, per cent.	CaO, per cent.	MgO, per cent	S., per cent.
24.44	21.30	39.99	10.76	2.53
25.52	21.54	38.13	11.28	2.43
24.42	21.72	35.01	10.62	2.02
19.30	20.75	42.00	14.70	2.17

IRONS, 100 PER CENT MAYARI.

Silicon, per cent.	Phosphorus, per cent.	Sulphur, per cent.	Manganese, per cent.	Chromium, per cent.	Nickel, per cent.
0.85	0.055	0.018	0.97	2.61	1.49
0.77	0.048	0.020	0.89	2.92	1.52
0.82	0.047	0.027	0.76	2.92	1.51

SLAGS, 100 PER CENT MAYARI.

SiO_2, per cent.	Al_2O_3, per cent.	CaO, per cent.	MgO, per cent.	S., per cent.
18.40	29.59	38.25	10.68	1.90
19.24	29.84	32.51	14.72	1.75
17.80	29.67	35.65	14.27	1.79
17.03	29.92	33.23	17.07	1.74

Table II.

SUMMARIES OF MONTHLY RECORDS OF REGULAR FOUNDRY TESTS ON CAST IRON, 10 PER CENT MAYARI IRON USED

Date.	Deflection, inch.	Silicon, per cent.	Sulphur, per cent.	Phos., per cent.	Manganese, per cent.	Combined carbon, per cent.	Graphitic carbon, per cent.	Total carbon, per cent.	Chro'm, per cent.	Nickel, per cent.	Tensile test, pounds, per square inch.	Transverse test. pounds.
April, 1912	8/32	1.85	0.115	0.605	0.73	0.55	2.84	3.37	0.43	0.18	29,066	3,327
May 15 to 31, 1912	9/32	1.78	0.139	0.700	0.61	0.64	3.15	3.44	0.21	0.18	26.491	3,300
June, 1912	9/32	1.60	0.132	0.596	0.60	0.76	2.68	3.44	0.32	0.16	29,315	3,420
July, 1912	10/32	1.72	0.128	0.563	0.66	0.67	2.71	3.38	0.37	0.18	28,121	3,354
August, 1912	10/32	1.69	0.152	0.520	0.61	0.76	2.64	3.40	0.34	0.21	28,198	3,459
September, 1912	9/32	1.52	0.152	0.474	0.65	0.74	2.61	3.35	0.37	0.22	29,729	3,473
Average	9/32	1.69	0.136	0.576	0.64	0.68	2.77	3.39	0.34	0.18	28,486	3,388
NO MAYARI IRON USED												
Feb. 1 to 8, 1912	7/32	1.59	0.118	0.637	0.69	....	....	3.13	....	....	24,335	3,200
April 27 to May 15, 1912	7/32	1.90	0.128	0.624	0.67	0.55	2.83	3.38	....	....	24,694	3,203
Average	7/32	1.74	0.123	0.630	0.68	0.55	2.83	3.25	....	....	24,514	3,201

The Technical Training of Steel Salesmen[1]

How the Carnegie Steel Co. Equips Its Sales Representatives With a Comprehensive Knowledge of the Iron and Steel Manufacturing Processes

By J M Camp

It was long recognized by the officials of the Carnegie Steel Co. that the salesmen in the field did not have the necessary first-hand knowledge of the processes of manufacture of the various products they sold; but the desultory and unsystematic efforts that were made to remedy this condition were, needless to say, without avail.

In the past, when a salesman showed an inclination to broaden his learning or to specialize along some particular line, the usual procedure was to bring him to this district and to let him roam at will through the works or mill that particularly interested him, without, as a rule, any person to guide or instruct him. The results of this procedure were so unsatisfactory and the need for a better plan was so apparent, that in the summer of 1911 the president of the Carnegie company appointed a committee to report upon a more feasible means of carrying on, in a broad and systematic manner, this educational work.

The School For Salesmen

In the effort to solve the problem, an experimental school for salesmen was established, a school, that, with the experience of one year, now rests upon a firmly established basis. It is not a school to teach salesmen how to sell; none but salesmen should be employed for that purpose. The school is designed to show the salesman how iron and steel and their products are made, to familiarize him with the material he sells, to illustrate to him the painstaking care that is continuously being exercised in the various processes of manufacture in order to insure a commercial product of the highest quality, to show him wherein his product excels that of his competitors, and to furnish him convincing arguments that such is the case. The school is made up of salesmen gathered together from our agencies in all parts of the country. As practically all of these men are without technical training, the course must, of necessity, be made as simple as possible, giving the theoretical side of the various processes of manufacture in the plainest language in order to insure understanding.

Getting Acquainted With Raw Material

The greater part of the time is spent in the furnaces and mills of the various plants of the company. The first few days are devoted to the general principles of the manufacture of iron and steel, with a study of metallurgical and chemical terms in order to familiarize the student with their uses. Following this comes a treatise on the foundation of the industry, the Lake Superior iron ores, giving a description of the commercial grades, the different ranges, with particular attention to the Mesabi field from which the greater part of our product is derived. The differences in the three types of mining—open cut, milling and underground—are shown, and the distinction between basic and Bessemer ores is made clear. Attention is called to the difficulty of securing ores of constant composition owing to the variations constantly being met in the same mine, how important this uniformity is to successful furnace operation, and how these variations are being overcome, as best they may, by combining the ores from the same and different mines to make up the furnace burden. Then comes a study of transportation, including the loading of the boats, their movement to the Lake Erie ports, and the transfer of the ore to the cars and from the cars to the furnace bins or stock yard.

After this comes a study of the actual process of coke making, one day being devoted to the bee-hive process, as illustrated in the most modern plant of its type in the Klondike region, followed by a day at our by-product plant at Farrell, Pa. Next the subject of limestone is covered by a short treatise showing the location of the quarries, the distinction made between stone for the various metallurgical processes, and the importance of a uniform, and preferably low, silica content.

Now with the necessary raw material on hand to charge a blast furnace, we are ready to build and operate one, and the next few days find us studying the construction and operation of the furnace by means of lectures and descriptions from the best text books on the subject, alternating study with the practical operation of the furnace. We finally build our furnace—foundation, crucible, bosh, stack, top hamper and hoist, downcomer, dust catcher and stoves. We follow the charge through the furnace, note how the ore is reduced, melted, drawn off into ladles for transportation to the mixers, and the disposition of the by-products; how the slag is tapped off and granulated for use in cement making, or sent fluid to the dump and there broken up and screened for its various uses; how the gases are utilized under the boilers, in the stoves, or washed and scrubbed until cleaner than the natural air, for use in the internal combustion engines.

Steel-Making Processes

With the mixer full of molten iron we proceed to the conversion of the iron into steel by removing all or part of the undesirable elements present. This involves the study of the well-known processes, followed by a consideration of the electric and the duplex methods. Taking up the Bessemer process first, we alternately study and inspect this process until the principles are thoroughly understood. There is a marked advantage in alternating the reading with the inspection of a process; the men are not so wearied, coming fresher to the attack, and the understanding is quickened.

Following the Bessemer process, both acid and basic, we take up the open-hearth process. At a plant so well equipped with open-hearth furnaces as the Homestead works, we can find furnaces almost at any time in every stage of reconstruction, thereby enabling the students to watch the work of rebuilding, if need be to enter the furnaces, regenerative chambers and flues, and thus become familiar with their construction. The charging of the furnaces is observed—limestone, ore, scrap, followed later by the molten pig iron—and the

[1]Presented at the Pittsburgh meeting of the American Iron and Steel Institute.

heats are boiled down, tapped, recarburized, teemed into the ingot molds, and the ingots stripped and sent to the soaking pits preliminary to rolling. The electric and duplex processes are taken up. The advantages of steel made by the former process for special purposes is shown, and the many forms of duplexing are studied, together with the special adaptation of each for its purpose or environment.

Learning Rolling Mill Processes

With the completion of the study of the various commercial processes for the manufacture of steel, we take up rolling mill work and our time for the next few weeks is spent continuously in the works of the company, the greater part of the time being consumed in the larger works, most typical of the processes. It is the purpose, however, to spend a short time at least in each of the principal plants. At these plants the students take note of everything they see. All the doubtful points are explained to them, including the manner of heating, type of engine, style of mill among the many forms that exist, giving particular attention to the finished product. Instances are known where men for years had been selling a product they had never seen. The points to which particular attention is directed with regard to finished material of all kinds have been carefully compiled, being added to from time to time, and they make interesting reading. At several of the works one or more of the practical mill men are delegated to give a talk to the students, strictly from the mill standpoint, showing the limitations and possibilities, illustrated by examples of rolling mill work on hand, bringing out and emphasizing the importance of furnishing exact data to the mills at all times. These talks have met with great favor, and it is proposed to extend them to include other mills.

Learning Laboratory Methods

After we become familiar with rolling mills and rolling mill products, we take up the study of the elements entering into the composition of steel, of chemical and physical testing and of defects in material. Naturally, the chemical testing should be done as soon as the steel is made and previous to rolling. I have placed it here for convenience only. In the study of the effects of the elements entering into steel, we take into consideration both ordinary and alloy steels, including all commercial steels of the day. After this, our time is spent in the chemical and physical laboratories, in the former, watching the routine methods of analyses, not with the expectation of becoming chemists while we wait, but rather of learning how carefully the raw material is scrutinized before it is used, and the watchful care that is continuously exercised to keep the product up to the standard. Usually a copy of the method of analysis is given the students beforehand in order that they may follow better the analyses as they are being made. In a physical testing laboratory, such as we have at the Homestead works, where all manner of testing is being done at all times, we soon become familiar with the different processes, the preparation of the tests, hot and cold bending, measuring and recording the stress when pulling, with the necessarily quick and accurate calculation by aid of the slide rule.

Learning About Special Products

It is at this stage that the attention of our students is directed to the ills to which steel is subject, due to both chemical and physical causes, their attention, however, having been called to these faults, whenever and wherever apparent, in our previous wanderings in the mills. Since examples of faulty steel are not always to be had when wanted, specimens illustrating the common and special faults have been accumulated, to which additions are being made from time to time, as opportunity arises. These are exhibited to the students, and upon them explanatory talks are given.

The next subject in our course is special products—methods of manufacture and properties. This includes a growing list of subjects usually handled by men specially trained for the particular purpose. It is readily apparent that the specialty of today may be the every-day appliance of tomorrow, making room for new specialties. It is our aim to anticipate this tomorrow by making the agents all equally familiar with the subjects. Among these specialties are steel wheels, gear blanks, axles, sheet piling, mine timbers, vanadium and other alloy steels.

In studying steel wheels, the students, having seen the steel made, follow the ingots from the soaking pit to the rolls. Attention is called to the enormous reduction from the ingot to the finished round from which the wheel blanks are cut, the high discard to insure freedom from piping, and the careful inspection and chipping of the blanks preliminary to shipment to the wheel works. Here the entire course of manufacture is carefully studied. This includes a study of how the blanks are weighed and carefully heated, the heat being restored at the different stages; forged to the approximate shape, core punched out, wheel rolled to a finish, coned, stamped with the identification marks, set aside to cool, the preliminary inspection followed by the requisite machine work, and the final rigid inspection of the finished wheel before shipment. With all this before them, metallurgically and mechanically, so perfect in all its details, the pride in the product and the argument that accompanies it is apparent.

Discussions and Reports

In a similar manner the manufacture of the remaining special products is studied and their relative merits developed—axles and heat treatment to develop their best properties, hot versus cold-worked splice bars, etc. In the case of the majority of these specialties, men trained along the particular line give the students discourses embodying the fruits of their knowledge based on long experience.

Upon completion of our studies in the mills we take up and follow the path of orders through the city office, then to and through the mills. Our purpose is to impress upon the students, so as to be remembered when they return again to their fields, the importance of properly dressing their orders, and how necessary it is to the office and mills that their orders should be specific, concise and correct, with all the data at hand as to how our customers want their material, how they treat or handle it, and what use they make of it.

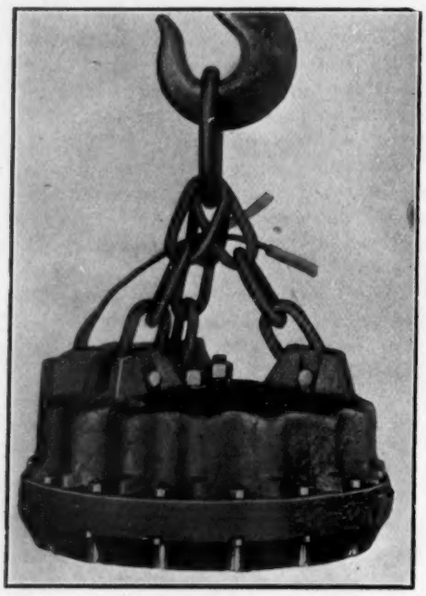
Examination of Salesmen

At every step, the students are expected to take notes and upon completion of the study of the particular plant or process to assemble in the evening and discuss the subject. Here ideas are exchanged, disagreeing viewpoints are argued and settled. And finally, when the heat of discussion has cooled, the students write up collectively one description of the subject. This, upon presentation to the writer, is gone over carefully with the students and if satisfactory, covering the salient features and indicating that the proper thought and time have been give it, is approved and typewritten. Copies are given to each of them for insertion in their

binders, or, in the majority of cases, a more complete description is substituted for it. If the description is not satisfactory, something that rarely happens twice to a class, it is returned to be done over. At the end of the course, by this procedure, each member of the class carries away with him about 200 pages of very valuable and highly-prized notes, maps and tables.

amination consuming about five days, with a few days preceding devoted to

Last, but not least in importance, is the test to determine how much of these notes that may be carried under the arm, are also lodged in the head, where they can be of most service. There follows the examination period, equally dreaded with the examination days of our school or university life. It is a written exreview, and may include any subject



LIFTING MAGNET FOR HANDLING CASTINGS, SKULL CRACKERS, ETC.

in the course. It is essential that there should be an examination. Aside from the question it solves, "Are our efforts bearing good fruit?" the examination is a potent, and in one or two instances a necessary stimulus to endeavor, keeping the men on their mettle throughout the course. The relative standing of each man, as developed by the examination, is given to him and him only, and this result he is expected to transmit to his chief and any further diffusion of his standing rests with these two. Naturally it is the aim of the next man from this office to break the record and the result is a continuous incentive to labor.

In this, the latest move for *increased business efficiency*, the results, so far as can be seen from our first efforts, are extremely gratifying both to the students and to the officials of the company. Twenty-five salesmen have completed the course and have returned to their stations with a new and broader understanding of their duties. At the beginning of the work, the men selected for the class took up their duties with seeming, and in several instances, pronounced reluctance, as if it were a disagreeable medicine that had to be taken. Now it is a privilege eagerly sought for and we have a fast-growing waiting list for future classes. In this educational work we are still young. The field is entirely new. We are but feeling our way. Suggestions are eagerly sought for. Improvements are continuously being made, and it is our hope that ere long we will be proud of our school for salesmen.

A New 24-Inch Lifting Magnet

For various classes of work, such as handling light finished parts, castings, etc., and for lifting skull crackers for breaking scrap and skulls, a small lifting magnet can be used to advantage. For this reason the Cutler-Hammer Clutch Co., Milwaukee, has added a standard, 24-inch, circular type lifting magnet to its line. This magnet is built as strong and water-proof as those of larger size and is, in fact, a development of a type recently furnished for submarine service. The magnet shown in the accompanying illustration is provided with a special pole shoe for handling 24-inch and 36-inch skull crackers. The terminals of the magnet coil are permanently insulated. The net weight of this magnet is only 750 pounds and has a capacity for lifting a skull cracker 10 times its weight.

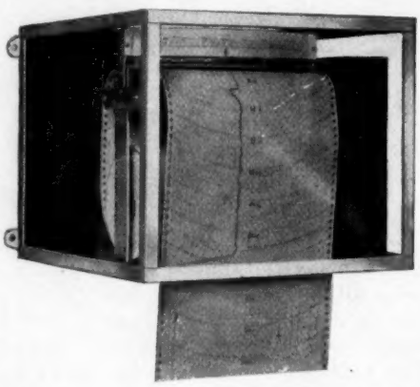
Continuous Chart Recording Pyrometer

A continuous chart recording instrument, particularly designed for use as a pyrometer, but which can be employed also for indicating volts, amperes, revolutions per minute, mechanical operations, etc., is now being manufactured by the Brown Instrument Co., Philadelphia. This pyrometer is of the frictionless type, the pen making a single dot of ink momentarily on the paper at short intervals, every 10 seconds or every minute, as desired, and these dots practically form a continuous line. The instrument carries a six month's roll of recording paper, which travels slightly more than 1 inch an hour and thereby eliminates the necessity of changing the charts daily. The record can be torn off as desired every day, once a week, or can be allowed to roll up continuously. As shown in the accompanying illustration, this instrument is enclosed in a plate glass case and only a small current of electricity is required for its operation.

Book Reviews

The Modern Gasoline Automobile; by Victor W. Page; 700, 6 x 9-inch pages and 500 illustrations, published by the Norman W. Henley Publishing Co., New York City, and furnished by THE IRON TRADE REVIEW for $2.50, postpaid.

This treatise on the gasoline automobile is written in simple language by a recognized authority familiar with every branch of the automobile industry. The information contained in this work includes in addition to an exposition of principles of con-



CONTINUOUS CHART RECORDING PYROMETER

struction and description of all types of automobiles valuable suggestions on the care and operation of motor cars propelled by internal combustion engines. Every part of the automobile, its equipment, accessories, tools, supplies, etc., is discussed comprehensively.

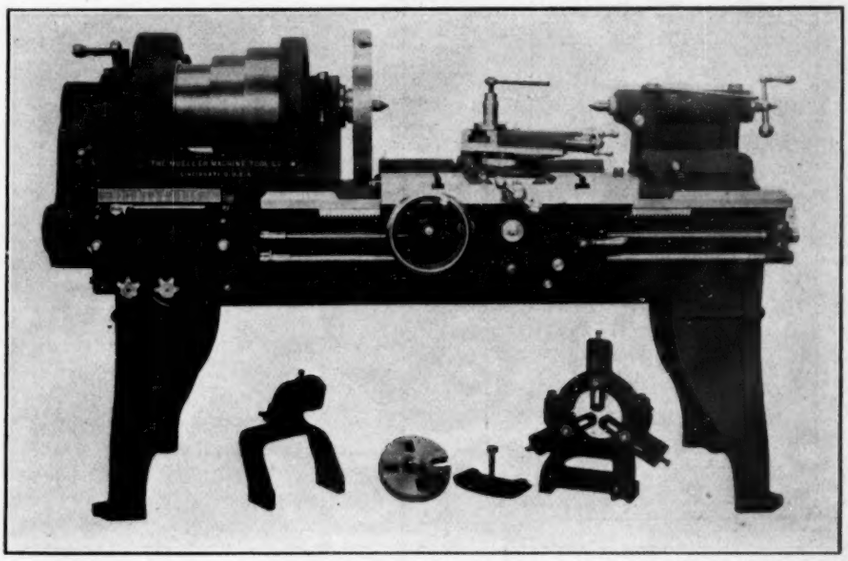
Blast Furnace Chemistry; by Dr. Carl Krug; 226, 6 x 9-inch pages, 31 illustrations, German, published by Julius Springer, Berlin, and furnished by THE IRON TRADE REVIEW for $1.50.

This volume comprehensively discusses the work of the blast furnace chemist at German iron-making plants and includes details of both qualitative and quantitative determinations of the various elements in iron ore, pig iron, fluxes, etc. Numerous methods of making these determinations likewise are presented and the work should prove of value to blast furnace chemists.

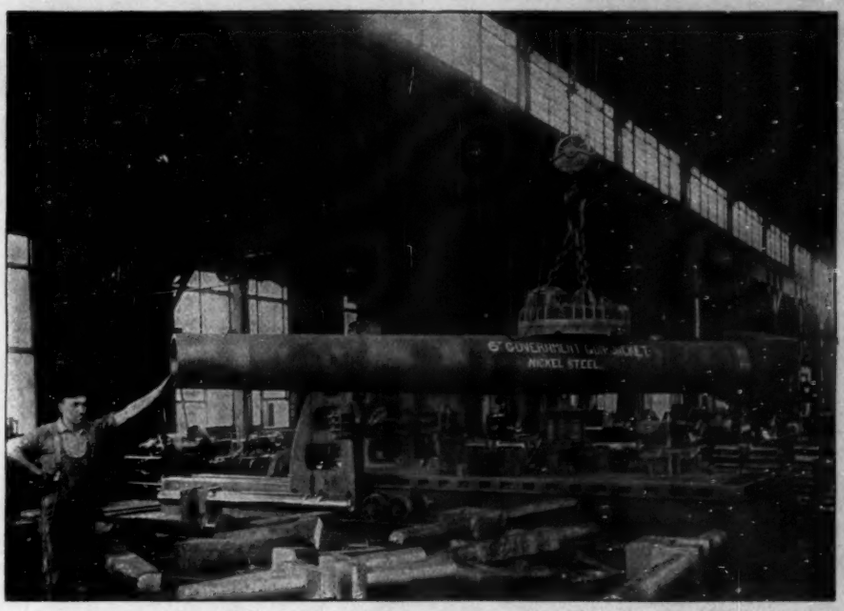
A New 18-Inch Engine Lathe

In the accompanying illustration is shown an 18-inch, heavy duty engine lathe, built by the Mueller Machine Tool Co., Cincinnati. The length of the bed is 6 feet 3¼ inches, the swings over the carriage, 13¼ inches and over the ways, 18½ inches. The headstock cone has three steps. The tailstock, as well as the headstock, is set off-center, which permits of machining work unusually large in diameter and thereby prevents the bottom slide of the carriage from overhanging its bearing. The double back gears are of the slip-gear type and have a ratio of 3½ and 10½ to 1. The spindle is made of high carbon crucible steel and has an opening, 1 9-16 inches its entire length. There are nine spindle speeds, ranging in geometrical progression from 13 to 300. Forty-five changes of thread, from 2 to 60, including 11½-inch pipe thread, can be cut. All changes are obtained in the quick-change gear box and reversing gears on the head are arranged to receive change gears for special and metric thread cutting. All threads can be cut without the removal of the gear and the chasing dial on the carriage permits the operator to catch threads instantly without being compelled to return the carriage by reversing or stopping the lathe.

The carriage has a long bearing on the V's and an adjustable taper gib the full length of its bearing against the rear of the bed, which eliminates the possibility of twisting the carriage while heavy cuts are being taken. The apron is a rectangular box in which all the bearings for the gears and screws are cast integral with the apron. The lead screw is 1 9-16 inches in diameter and is rotated only when screw cutting. The countershaft has double-friction pulleys, 14 inches in diameter for a 5-inch belt. The complete equipment furnished with the lathe consists of two face-plates for large and small stock, compound, steady and follow rests, countershaft, etc. The net weight of the machine is 3,200 pounds.



HEAVY DUTY, 18-INCH ENGINE LATHE BUILT BY THE MUELLER MACHINE TOOL CO.



ELECTRIC MAGNET USED FOR LIFTING A 6-INCH NICKEL STEEL GUN JACKET

Lifting Magnet Economies

The Titusville Forge Co., Titusville, Pa., employs a lifting magnet for unloading heavy steel billets, for handling heavy forgings and for loading crop ends or turnings. In the accompanying illustration is shown a 42-inch magnet handling a 6-inch nickel steel gun jacket. This is a 42-inch magnet which was furnished by the Electric Controller & Mfg. Co., Cleveland. Prior to the installation of the magnet, the cost of loading 25 tons of crop ends or turnings was $4.60, whereas with the magnet, 25 tons of this material are loaded at a cost of only 78 cents. On a tonnage basis, the cost has been reduced from approximately 9 cents a ton to 1½ cents a ton. These figures include 6 per cent interest on the magnet, together with an annual depreciation of 4 per cent.

The general sales department of the Titanium Alloy Mfg. Co., Niagara Falls, N. Y., has been removed from Pittsburgh to the plant at Niagara Falls. A district office, however, will be maintained in the Oliver building, Pittsburgh.

The prevention of waste of metals is said to be largely a question of their preservation. Metals like copper, iron, gold and silver tend to accumulate and add to the world's stock. Zinc and probably some other metals are dissipated each year in quantities almost as great as the amount produced. Accordingly, any means that tends to prevent the destruction of metals, whether it be the use of protective coatings of cement, enamel or paint or the addition of some substance that renders the metals comparatively immune, such as the addition of copper to iron, is of the utmost importance in intelligent conservation.

Developments in Open-Hearth Steel Practice[1]

Economies Effected by Increasing the Capacities of Furnaces and the Use of a Divided Spout for Pouring Into Two Ladles

By N E Maccallum

Almost half a century has passed since the Siemens brothers, after tedious and costly experiments, finally began the manufacture of open-hearth steel. The furnace of that time was very small, having a hearth capacity of from 3 to 4 tons, and we can appreciate the wonderful development that has taken place in those 50 years by the knowledge, that today, furnaces of 50 times the original capacity are in operation. As the new steel process assumed importance, and furnaces began to grow in number and in size, a question arose, to which no satisfactory answer has ever been given, and that was: "What is the safe and economical limit of the open-hearth furnace?" Various stopping places have been suggested, and 20, 30, 40 and 50 tons have each been advocated, but all such arbitrary restrictions have been passed, and 60 tons would probably represent the average furnace, although in a few instances from 70 to 80 tons are regularly tapped into one ladle. The furnaces which are the subject of the present paper have gone far beyond even these limits, and since, in my opinion, they mark another step in the progress of open-hearth steel, they will be considered fairly and frankly, in order that those to whom the matter may be of interest may be able to judge and form their own conclusions.

[1]Presented at the Cleveland meeting of the American Institute of Mining Engineers.

Divided Spout

These furnaces are operated by the Phoenix Iron Co., Phoenixville, Pa., and their distinctive and important feature is, that they charge to twice the capacity of one ladle, and tap simultaneously into two ladles, with a device for controlling the flow into either. In this way the capacity of the furnace is not limited, as formerly, but heats of any size within the capacity of two ladles may be charged.

The ultimate reason for charging furnaces beyond the normal amount is not that large heats may be made, but because by making large heats a material increase of product is obtained.

A plan of the divided spout, pits and ladles is shown in Fig. 1. In order to make the branches of the spout as short as possible, one ladle is placed slightly in advance of the other, which also enables the trunnions to clear. Fig. 2 is a plan and a front elevation and Fig. 3 a side elevation of the device for controlling the flow of steel into either ladle. Its purpose is not to stop, but merely to check, the flow. The levers by which it is operated are placed from 20 to 30 feet from the center of the furnace, and the controlling rod is protected by fire brick, much the same as the ladle rod.

The first of these furnaces, here designated A, B and C, was com-

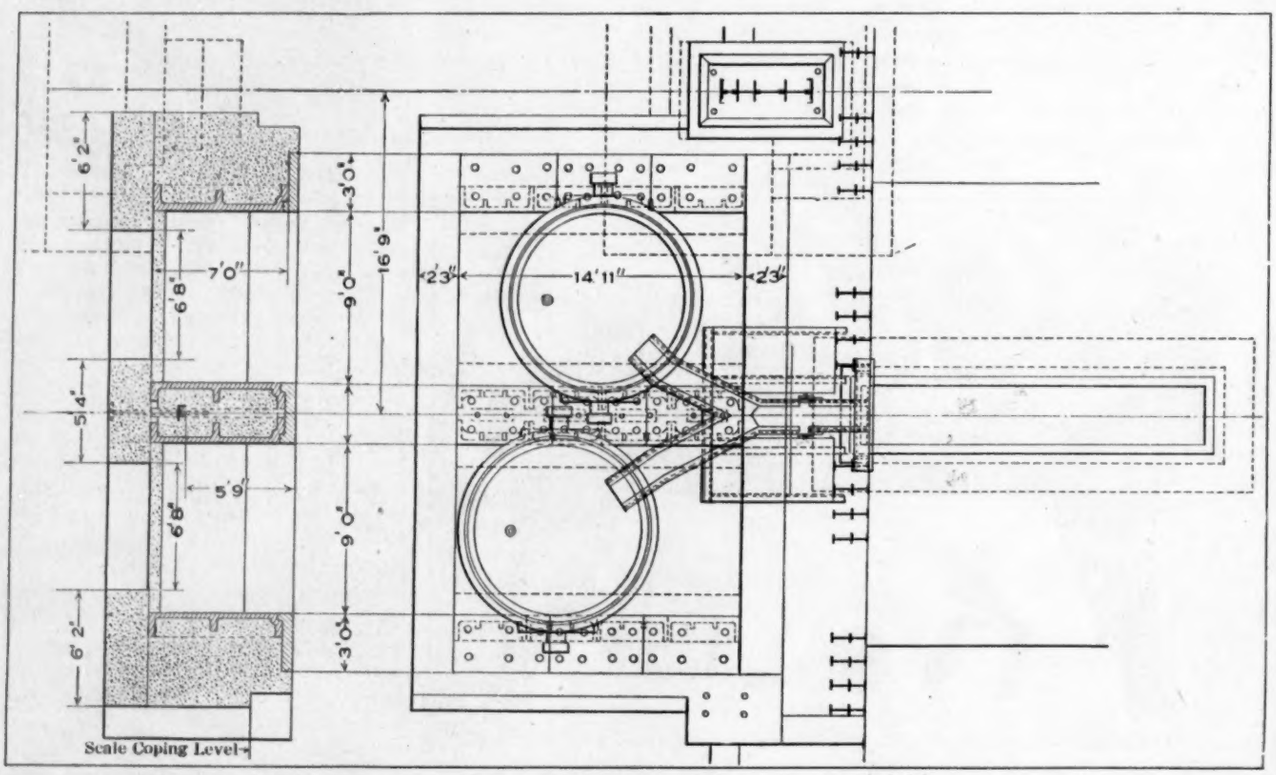


FIG. 1—GENERAL PLAN OF THE TWIN LADLE PIT AND SPOUT FOR OPEN-HEARTH FURNACES OF LARGE CAPACITIES

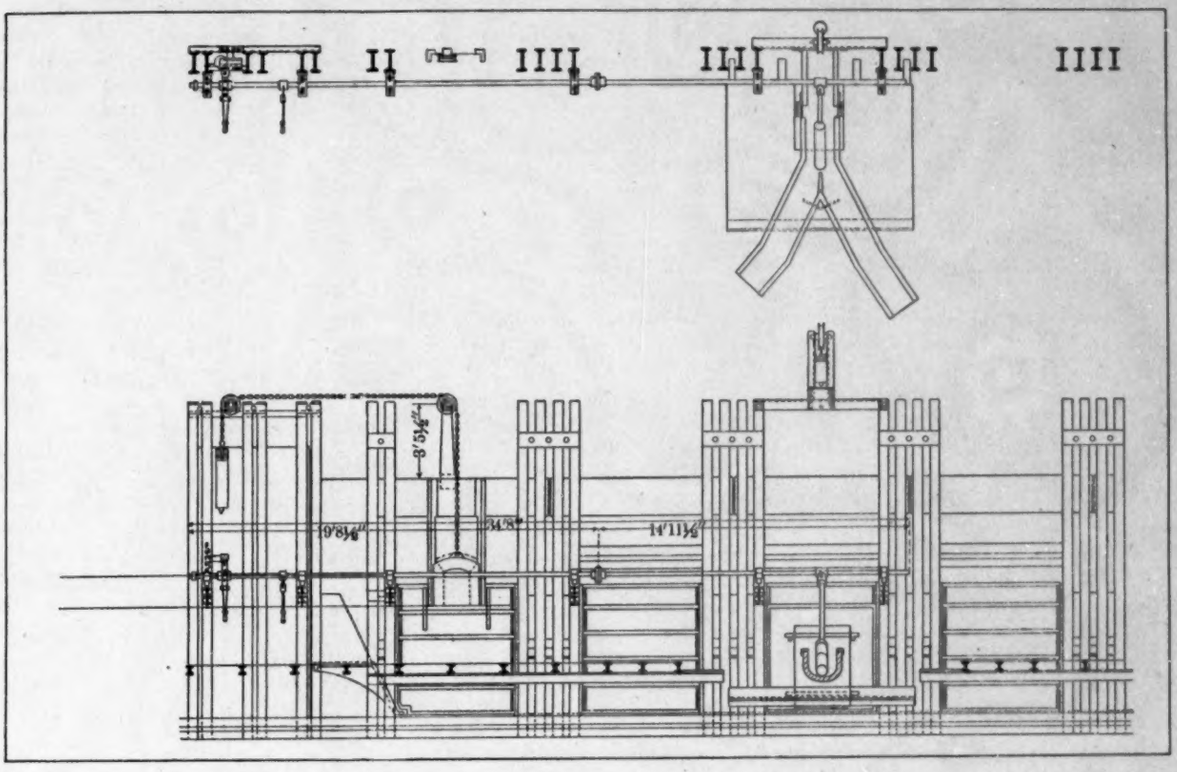


FIG. 2—PLAN OF STREAM CONTROLLER FOR TWIN RUNNER SPOUT AND FRONT ELEVATION OF OPEN-HEARTH FURNACE

pleted early in 1909. The area of the hearth was 32 x 14 feet, and was a fair average of furnaces charging from 50 to 55 tons of materials. At that time no thought had been entertained of breaking away from the established practice, but, on comparing the capacity of this hearth with those of our smaller furnaces, it proved to be so much in excess that the question was raised as to the advantage of a large hearth if it could not be fully utilized. Various experiments were then undertaken to determine the feasibility of using two ladles, and the best means of controlling the flow into either ladle, which resulted in our present practice.

The Furnaces

Furnace B, completed in September, 1909, was the same in all respects as furnace A, except that the hearth was lengthened 4 feet, making it 36 x 14 feet in area.

Furnace C was built in 1911, the size of the hearth being increased to 42 x 15 feet. The size of the regenerator chambers was also increased. These chambers were designed to meet existing conditions. The air chambers of furnaces A and B are 9 feet wide and the gas chambers, 6 feet wide. For furnace C the air chambers are 12 feet wide and the gas chambers, 8 feet wide. The length of chambers and depth of checker work are uniform for all the furnaces, 18 and 7 feet respectively. If these furnaces are rated as 115 tons, 130 tons and 165 tons capacity, which is the usual weight of ingots tapped from each, it will be noted that the checker space on each end of the furnace is only equal to about 15 cubic feet per ton of hearth capacity; or, one-sixth of the amount generally allowed and recommended by prominent metallurgists. This statement is not made from any desire to criticize or detract from the prevailing views and practice; but it might be worth while to note that, had this practice been followed, the depth of checker space in furnaces A, B and C would have been 46 feet instead of 7 feet. Or, to state the same thing in another way, the rated capacity of the furnaces, based on checker space, would be 19 tons for furnaces A and B, and 25 tons for furnace C, instead of 115, 130 and 165 tons. It may, therefore, be safely assumed that any particular merit which this practice possesses must be attributed to causes other than the chambers.

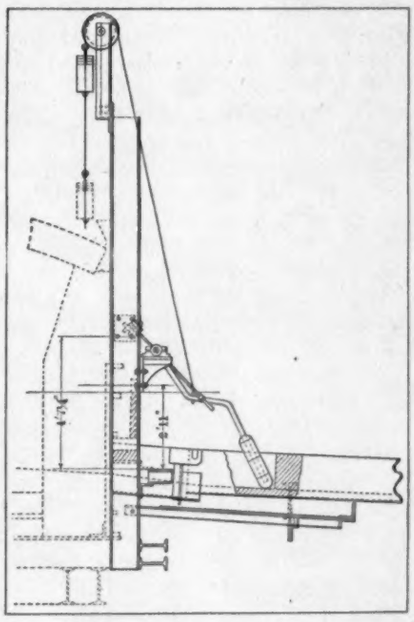


FIG. 3—SIDE ELEVATION OF STREAM CONTROLLER

Hearth Areas

The areas of the hearths of furnaces A and B were practically the same as those of ordinary furnaces rated at from 50 to 55 tons capacity, and that of furnace C, 42 x 15 feet, giving an area of 630 square feet, is almost an exact duplicate of the area of a number of furnaces recently completed and rated at 60 tons. The hearths are of the usual depth and measure from pan plate to top of foreplate, 5 feet, 0.5 inch. The pan is covered with 18 inches of brick and from 10 to 12 inches of magne-

site in front of the tap hole. If, therefore, the hearths are of the same size, and the chambers are much smaller than those of many other furnaces, it is apparent that the large tonnage must be due to other reasons, which we shall endeavor to show lie not in the furnace, but in the practice.

On one occasion, in discussing methods of operation with the superintendent of a large steel concern, I asked if he reduced the size of open-hearth heats at the week end, and the reply was that he did not, as it had been found that a large heat could be made almost as quickly as a small one. That was the open-hearth man's way of broadly stating a truth, which was not intended to be accepted too literally. It is not true, of course, that a large heat can be made as quickly as a small heat, but it is true that steel is made faster in a large unit than in a small one. This seems an obvious fact, yet it is one that receives but little attention and is rarely considered in comparing the work of one furnace with another. In most works, the number of heats which each furnace makes weekly constitutes the basis of comparison; but it is evident that for furnaces of different capacities it would be of little value, since the small furnace might make more heats and yet not equal the tonnage of a larger furnace, or, in furnaces of similar capacities, one might be delayed with repairs to hearth or otherwise and show a decreased tonnage, although it might be a faster working furnace.

Table I.

DATA OF FURNACE PRACTICE.

Furnace	Hearth area.	Weight of ingots, tons	Time per ton, minutes.
No. 3.....	17.5 x 12 ft.	30	32.79
No. 5.....	20 ft. 3.5 in. x 12.5 ft.	40	26.48
No. 1.....	24 ft. x 12.5 ft.	50	19.66
A.....	32 x 14 ft.	115	11.50
B.....	36 x 14 ft.	130	10.50
C.....	42 x 15 ft.	165	8.68

For a number of years I have used, as a basis of comparison, the time from beginning the charging until the tap hole is open, divided by the product, which gives, in minutes per ton, the rate at which steel is being made. This gives a reliable means of determining the speed with which any furnace is capable of making steel, and also its ability to compete with other furnaces. Using this method of comparison, Table I has been compiled from furnace records of the Phoenix Iron Co. In every case the record covers a period of not less than six months and should be fairly representative of the work done by each furnace. The smaller furnaces are of the older type with regenerators underneath the hearth, but did efficient work and compared well with other furnaces of similar construction. Furnace C was built on the site formerly occupied by two of the smaller furnaces, Nos. 5 and 6, and it is interesting to note that furnace C is making steel just a little more than three times as fast as No. 5 formerly did.

A study of Table I will reveal two significant facts: One, that the economical limit, so far at least as time is concerned, has not been passed, since furnace C is shown to be making 21 per cent faster than furnace B. The other, the striking decrease in minutes per ton as the hearth area and unit of steel increase, and it is on this fact that the practice of the Phoenix Iron Co. is based. The extent to which any furnace may add to its product will be proportional to the excess charged over the normal one-ladle heat, but from the experience of the Phoenix Iron Co., it may be affirmed that by doubling the normal charge the product of any furnace can be increased by from one-fourth to one-third; that is, if a furnace charging single-ladle heats can produce, say, 600 tons weekly, it will by charging double-ladle heats produce from 750 to 800 tons. This can be demonstrated readily by operating any furnace alternately on single-ladle heats and half-ladle heats, and comparing the number of minutes required in each case to make a ton of steel.

Why should steel be made faster in large units than in small? No particular reason can be assigned, but there are several probable causes which contribute to that result. The first and most important is the economy in time; that is, in a given time more steel will be produced, or the same amount of steel will be produced in less time. This can be better understood by dividing into two periods the time required to make a heat of steel, the first period being the time required to charge and melt, and the second period from the time when the lime floats to the surface of the bath until the heat is ready to be tapped, known as the *working* of the heat. In the first period the double-ladle heat will not show much gain over the single-ladle heat, as it will take almost twice as long to charge and melt, but in the second period, when spar, ore and other additions are made, the double-ladle heat gains a decided advantage, since it takes but little longer to work a large heat than a small one. At various times during the past three years single-ladle heats have occasionally been made on furnaces A, B and C, and a careful scrutiny of the records shows that the average time required to make a ton of steel on those heats was 12.2 minutes, while the average time at which furnaces were running on double-ladle heats was 9.7 minutes, showing that it required 25.7 per cent more time to make a ton of steel on a single-ladle heat than on a double-ladle heat.

Reason of Time Economy

As a second cause, it is evident that twice as many single-ladle heats will be required to produce the same tonnage as that from double-ladle heats, therefore one-half the time which would be required to make repairs to the hearth in the former case will be available for making steel in the latter. Then again, each heat of steel that is made, whether large or small, entails two extremes of temperature, the cooling of the hearth and furnace when cold stock is introduced, and the maximum temperature necessary to tap, at which time the hearth and furnace must be raised to at least the same temperature as the steel. It will, therefore, take twice as many heat-units to raise the furnace and hearth to this temperature to make two single-ladle heats as would be required to make one double-ladle heat, just as in heating water or other substance in a refractory vessel, less time will be required to heat a certain amount in one portion than to divide that amount into two portions and heat each separately, the difference in time being that required to heat the container a second time.

A third cause is radiation. Campbell, in reference to heat-distribution in an open-hearth furnace, says: "Roughly speaking, about one-half of all the heat supplied to an open-hearth furnace is lost by radiation and conduction." That statement concerns the present paper only to

the extent that the more frequently a furnace is raised to a tapping temperature the greater will be the loss by radiation, as the latter increases with each degree of increase in temperature, so that the smaller number of heats that are made in proportion to the tonnage, the less frequently will the furnace be raised to a tapping temperature, and the less will be the loss by radiation.

These views have been advanced with some hesitancy, but they appear to offer a reasonable explanation why steel is made faster in large units than in small ones. To confirm these arguments further, a statement of the actual tonnage which each furnace has made is given in Table II. All the stock is charged cold, and the fuel used is producer gas.

Furnace C has still five weeks in which to complete the year and should run well over 50,000 tons, which is probably the largest tonnage that has ever been produced from any furnace using all cold raw material.

Saving in Cost

The saving in cost, which will be proportionately increased as the tonnage increases, depends upon labor, fuel and repairs.

The number of men necessary to operate a furnace on a double-ladle heat is the same as on a single-ladle heat, and if the product is increased one-third, it is apparent that the labor will be reduced one-fourth, including all furnace labor except that of the stock-loaders.

The fuel (gas coal), covering a period of several months, will not vary much whether the furnace is making large or small heats, and, as is the case with the labor, should show a saving of one-fourth. Furnaces A and B are on the same gas line as the blooming mill soaking pits, and, consequently, it is difficult to get accurate data. Furnace C, however, is supplied from an independent line, and the figures used are based on the actual amount of coal received in the cars.

On a run of 22 consecutive weeks, including the entire time from commencing the first heat until shut down for repairs, the average amount of coal used per ton of steel was 547 pounds. Just whether this represents a saving of one-fourth is uncertain, but we can estimate what the amount of coal would have been had the furnace been operated on single-ladle heats, in which case the product would have been reduced one-fourth and the amount of coal increased one-third. Furnace C averages slightly more than 1,000 tons of product weekly, so the product would have been 750 tons, and the coal increased one-third would have been 729 pounds per ton of steel. That is, instead of 1,000 tons of steel, with a coal consumption of 547 pounds, on double-ladle heats, we should have 750 tons of steel, with a coal consumption of 729 pounds on single-ladle heats.

Bearing in mind the arguments that were advanced in explanation of the increased product of large heats, the use of pig iron with an average content of 0.70 per cent phosphorus and 0.70 per cent silicon, with considerable quantities of lower grade iron as cheapeners, together with the miscellaneous scrap that the market affords, 729 pounds of coal cannot be considered excessive for eastern practice, particularly covering a period of 22 weeks, so that it is probable a saving of one-fourth is not far wide of the mark. With larger regenerators it is likely a still further saving might be effected.

What has been said in regard to labor and fuel should also apply to repairs. That is, in a given period the wear and tear will be about the same, regardless of the size of the heat or of product. In the run of 22 weeks, the total product from furnace C was 24,298 gross tons, and the repairs that followed, including roof, linings, checkers, cost of brick, bricklaying and common labor, was a fraction less than 12 cents per ton.

Having discussed the increased product and economies resulting from the two-ladle practice, what are the objections likely to be raised against this method of steelmaking? Probably the first would be the risk of handling such large quantities of steel and the possible consequences in case of accident. In reply, it may be said that in modern open-hearth practice, when linings have been increased in thickness, partly to overcome excessive radiation and partly to prevent accidents, break-outs rarely occur, and as double-ladle practice requires only one-half the usual number of heats to produce the same tonnage, it is evident that that risk, whatever it is, has been cut in half. It may be imagined that serious trouble might result from the chilling of a heat in the furnace, as occasionally happens when the roof falls in. I confess that the first instance of this kind was viewed with some apprehension. It occurred on furnace B, when a charge of 335,000 pounds was melted; the roof from hip to hip fell in. This happened at 8 a. m. on a Saturday, and during the next day the roof and lining were replaced. Gas was turned in at 5:30 a. m. Monday, and the heat was tapped at 10 p. m. Tuesday, yielding 139 gross tons of ingots. A similar experience occurred another time, but in neither case were any difficulties presented other than would be encountered in smaller heats. The divided spout and controller have at all times worked satisfactorily, and no trouble has been experienced in dividing the steel, although occasionally one ladle may receive more than the other, but generally both ladles are evenly filled.

Another objection that might be raised is, the difficulty the mills may have in taking care of the product in large units, but a little consideration will show that when mills are provided with sufficient soaking pit capacity, it makes but little difference. If the product is supplied from large furnaces, there will be fewer heats, whereas, if supplied from smaller furnaces, there must, necessarily, be more furnaces, and a largely increased number of heats, frequently causing what mill men call *bunching* of heats, that is, when several tap together or in close succession. That the large heats are not objectionable to the mill men is evidenced by the interest with which the tapping hours of the large furnaces are followed.

As to the quality of the steel, it may be said very positively that there is no apparent difference from that made in smaller amounts. The chemical analyses, the physical tests and fabrication of hundreds of thousands of tons, would surely have detected any difference had such existed.

Table II.

TONNAGE OF STEEL PRODUCED.

Furnace.	Period of time.	Output. Gross tons.	Time per ton of output. Minutes.	Fastest time for one ton of output. Minutes.	Largest heat. Gross tons.
A	First year	41,436	11.45	8.27	130.04
	Second year.....	39,910	11.54		
B	First year	43,900	10.38		
	Second year	43,615	10.44	7.49	146.32
C	47 weeks	47,200	8.68	6.92	177.77

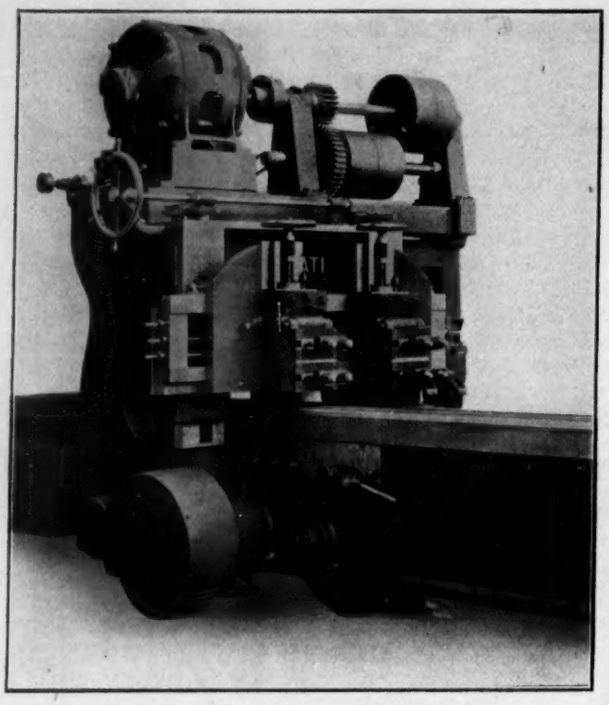


FIG. 1—OPERATING SIDE OF PLANER

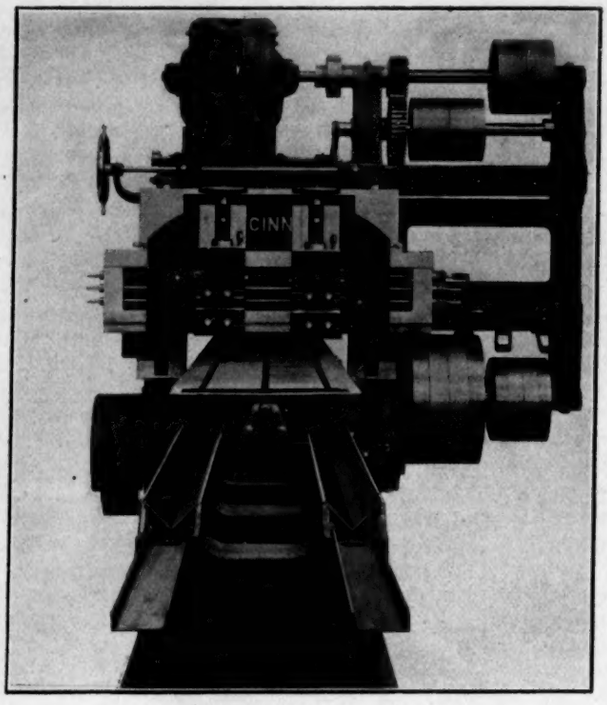


FIG. 2—FRONT VIEW OF PLANER

A 36-Inch Frog and Switch Planer

Designed especially for frog and switch work, the 36-inch planer shown in Figs. 1, 2 and 3, built by the Cincinnati Planer Co., Cincinnati, embodies several new features of machine tool design and construction. The planer is driven by two 4-inch belts and is operated by a 50-horsepower motor bolted to the top of the frame. The driving pulleys are 34 inches in diameter and are made of an aluminum alloy. The V's of the bed are lubricated by oil forced from a pump, which provides a film of lubricant between the bed and table at all times. The bed is of the deep type, braced throughout by box girders and is provided with four walls between the housings. The table is 32 inches wide and has an inside bearing on the bed its entire length, thereby overcoming the pressure of heavy side cuts. The housings are of box form, 10-inch face, and extend to the floor. They are secured to the bed by large bolts, dowel pins and a tongue and groove, 1½ inches deep and 5 inches wide.

The cross-rail is 18 inches wide and is provided with a ribbed, box brace at the back. In addition to the usual outside set of clamps, the cross-rail is secured to the housings by an extra set of clamps on the inside. If desired, the cross-rail can be attached to the housings by large dowel pins at various fixed heights. The heads have automatic cross and vertical feeds and are made right and left, to bring them close together. The saddle and harp are made in one piece without swivel and have a bearing on the rail of 25 inches. The levers are so arranged that the machine can be operated from either side and the shifting mechanism is provided with a safety locking device which prevents the table from starting except when set in motion by the operator.

The operating side of the planer is illustrated in Fig. 1 and Fig. 2 is a front view. Fig. 3 illustrates the driving side of the planer, showing the heavy cast frame supporting the pulleys and countershaft.

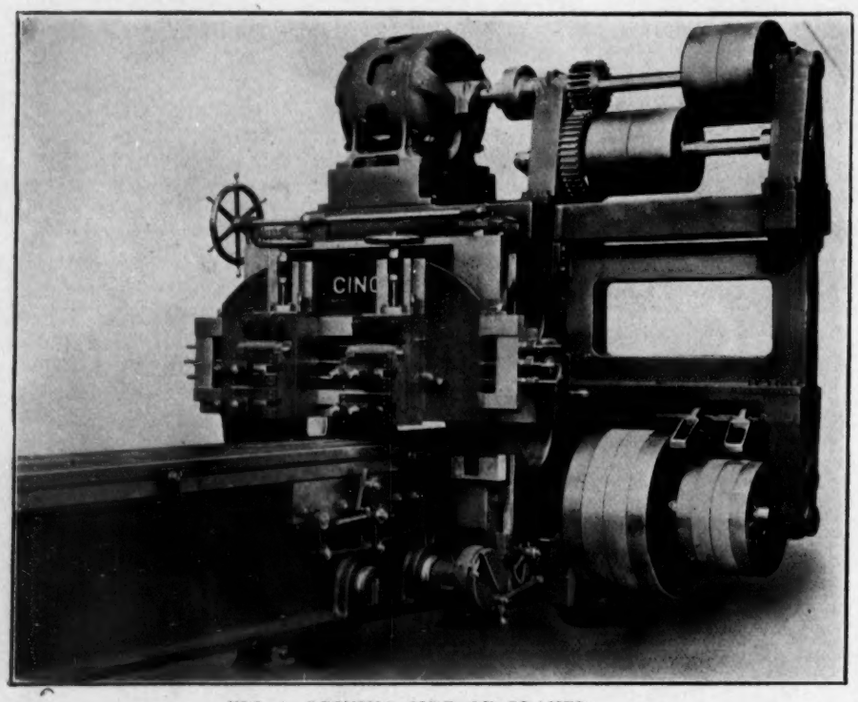


FIG. 3—DRIVING SIDE OF PLANER

In 1911 the United States excelled all other countries of the world in the conversion of raw asbestos into manufactured products, but a very small percentage—less than 1 per cent of the asbestos used—was mined in this country, by far the larger part being imported from Canada. The total production in the United States for 1911, according to the United States geological survey, was valued at $119,935.

Ordnance Manufacture at the Bethlehem Works[1]

How Heavy Artillery, Projectiles and Armor Plate are Made, With Details of the Tests and Description of the Machines for This Work

By E G Grace

The modernization of the armament of the United States, which has been permitted to fall behind that of the European nations for a quarter of a century, took concrete form in 1886. At that date our country was without facilities for making steel gun forgings or armor plate of the requisite size and quality, so the United States government determined to encourage the establishment of permanent domestic sources of supply by procuring the gun forgings and armor from private manufacturers, but decided to assemble and finish the guns at its own factories. Therefore, the navy department, in 1886, for the first time invited manufacturers in the United States to propose on the furnishing of about 1,300 tons of gun forgings and 4,500 tons of steel armor plate.

The Cambria Iron Co., Midvale Steel Co. and the Bethlehem Iron Co. (our predecessor) offered to furnish the gun forgings, and the Cleveland Rolling Mill Co. and the Bethlehem Iron Co. offered to furnish the armor. The Bethlehem Iron Co.'s proposal for both gun forgings and armor was accepted in April, 1887, at which time the company, forecasting the future, and desiring to be pioneers in this particular branch of the iron and steel industry, already had under way the erection of a plant for producing not only the gun forgings and armor, but finished guns as well.

First Order for Gun Forgings

Similarly, in 1889, the Bethlehem Iron Co. secured the first large order from the United States war department for steel forgings for its guns, and with the acquirement of these two orders for gun forgings, and the order for armor plate, the company entered into the first stage of its career as a manufacturer of ordnance.

In 1891, having completed its plant for building finished guns, it secured an order from the war department for 100 finished guns of 8-inch caliber and larger. This contract, the largest given by any nation for modern heavy guns, amounted to approximately $4,000,000, and I think it safe to say that without such a contract at the beginning, the Bethlehem company would never have been able to build up its present complete and modern ordnance manufacturing plant. This contract called for the furnishing of 25 8-inch, 50 10-inch, and 25 12-inch guns, to be delivered over a period of 12 years.

The guns were tested at the company's proving ground at Redington, Pa., located about six miles from its works. Each gun was fired ten times at high velocity into the mouth of a tunnel which had previously been drifted to a depth of 10 feet in solid limestone. It may be interesting to know that in the firing of the 1,000 projectiles in the test of these guns, the tunnel was extended an additional depth of 70 feet, and its original cross-section of 50 square feet was enlarged to 200 square feet.

Growth of Ordnance Department

In 1899 the company received an order to design and make an 18-inch gun, required for the test of the Gathmann torpedo projectiles. This gun, a success in every feature, weighed 60 tons, and its projectiles weighed 2,000 pounds each. Although it was built 12 years ago, the energy of its blow was practically the same as that of the great 14-inch guns with which our navy is now ahead of the rest of the world. This effort in 1899 marked the time when the company undertook the manufacture of ordnance work to its own designs, as well as those of the government, which field has been systematically extended until today, the company's ordnance engineering department numbers over 100 trained men, and its present successful ventures into competition with foreign manufacturers of ordnance has not only been due to its many years of experience in manufacturing, but more to its technical preparedness and ability.

Ordnance, defined, means heavy artillery—guns of large caliber. The company manufactures, in addition to heavy artillery, the mounts and sights for this equipment, and guns and mounts of smaller sizes, down to 1.43 inches caliber. It also furnishes ammunition of all kinds of sizes, shields for the various gun mounts, armor plate, and in fact is technically prepared to and is supplying the complete ordnance equipment for modern dreadnoughts, field artillery, and all classes of fortifications. This material is made at the company's Lehigh plant, which is self-contained, and is devoted almost exclusively to this and kindred products. The plant represented an investment of $25,000,000.

Among the company's ordnance constructions, I am going to describe the manufacture of a 12-inch gun, armor-piercing projectiles, and hard-faced armor plate. We are now building for the Argentine government a 12-inch gun of 50 calibers length and Bethlehem design.

The gun is composed of a comparatively thin liner, a tube surrounding the liner, and exterior hoops which surround the tube. The inside of the liner is the bore of the gun; the forward and middle portions of the bore are rifled, and the rear of the bore is enlarged to form the powder chamber.

When the projectile has been driven forward to a point in its travel in the gun where the propelling charge is exerting its maximum pressure in the bore, the gun has sufficient strength to resist practically twice the amount of the pressure without straining the metal in the gun to its elastic limit. Correspondingly, at the muzzle of the gun, where the pressure of firing has fallen to 15,000 pounds per square inch, the gun has sufficient strength to resist a pressure in the bore of 25,000 pounds per square inch.

Calculations of Strength

The calculations of the strength of the gun are based upon the shrinkages to be applied to the layers of hoops entering into its make-up, which are in turn based upon specified physical qualities in the steel used in its construction, and departure during manufacture in either of these respects from what is required, will have the gravest consequences. It is, therefore, to be expected that the most noticeable difference between the manufacture of guns and that of other high class finished material in-

[1]Presented at the Pittsburgh meeting of the American Iron and Steel Institute.

tended for industrial uses, is in the character of its inspection. The inspection, whether by the different governments' forces, or our own corps of inspectors, starts with the examination of the ingot before forging, and continues in one form or another, during all the operations, until the acceptance of the gun. It may be of interest to know that fully 17 per cent of the nine months actual time spent in the fabrication of a 12-inch gun, is consumed in its inspection.

Steel for Guns

All of the steel to be used in the gun, whether containing alloys or not, is made by the acid open-hearth process, using specially-selected stock, and each ingot is fluid-compressed to 89 per cent of its original volume. The ingot, after the examination referred to, is hollow-forged under a 5,000-ton hydraulic press, and is then rough-machined preparatory to tempering. The hollow ingot for a 12-inch tube is 16 feet long, 43¼ inches in diameter and weighs 67,700 pounds. When it has been forged and rough-machined preparatory to tempering, it weighs 28,000 pounds, and in its finished state the tube weighs 18,950 pounds. Correspondingly, the weight of the ingots for all of the forgings for one 12-inch gun is 458,000 pounds, the rough-machined weight of the forgings is 196,000 pounds, while the finished gun weighs 148,500 pounds. These figures give a fair idea of the large loss in weight the material of the gun undergoes during its fabrication, representing a yield from ingot to finished gun of a little over 32 per cent.

The specifications for gun forgings are especially drawn to insure in the forgings a close and uniform adherence to the physical qualities assumed in calculating the shrinkages and strength of the gun. The ability to meet these rigid requirements in the successful production of the gun forgings, without excessive and ruinous condemnations, has been acquired only after many years of experience in the gradual development of the various processes and products.

The forgings are tempered by being heated to varying temperatures, depending on their shape and composition, and then are immersed in oil, or water, as the case demands. They are subsequently annealed, and finally submitted to the government inspector, who selects official test bars, and directs and witnesses the pulling of the bars to ascertain if the forgings meet the prescribed physical qualities. Tests also are taken for complete chemical analysis.

The forgings having passed test, are next finish-bored in preparation for their assembling. This operation on the tube and liner forgings involves the use of boring mills with an over-all length of 150 feet.

The assembling of the forgings by shrinkage is done under very narrow limits of tolerance, both as to the diameter of the parts and as to the amount of heat that is applied in expanding the exterior part. The first and most difficult is the shrinkage of the tube on the liner, because of the great length and consequent lack of rigidity of these two pieces. After the tube has been bored, the liner is turned so that it is larger in diameter than the corresponding bore of the tube by the amount of shrinkage required. The determination of this difference in diameter is as precise as possible, and the character of the shrinkage surfaces must make them susceptible of reflecting the smallest errors in workmanship. The bore of the tube must be within 0.002 inch greater than the prescribed sizes, and dare not be less, and the outside diameter of the liner must be equally accurate. The necessity for this accuracy of work led to the abandonment of a 150-ton armor plate forging hammer, after being in operation less than two years, because the shock of its blows moved out of alignment the large gun boring and turning machines located some distance away.

The tube is uniformly heated until it has expanded so as to be slightly larger in diameter than the liner, and is then lowered over the liner until it is seated lengthwise, when it is cooled in such a way as to draw its shoulders against those of the liner.

Inspection

After the assembled tube and liner have sufficiently cooled, they are carefully inspected and measured. By this time the next outer layer of hoops are bored, and after their bores have been measured, the outside surface of the tube is turned to its shrinkage size, and the operation of shrinkage is repeated. To complete the shrinkage of the gun, its parts make six journeys to and from the assembling plant, and are set up in the gun lathes an equal number of times.

After the gun is completely assembled, the bore is machined at the rear end to form the powder chamber, the gun is then finish-turned on the outside, and finally, the last operation, namely, the rifling, is performed. This operation takes 180 hours. The rifling consists of 72 grooves, requiring 900 passes of the rifling cutters through the bore of the gun. The rifling machine consists of a pair of bearings in which the gun is held, and a table 60 feet long, on which a bar is supported. The bar carries the rifling cutters, and has a slot running its entire length which has the same pitch as the rifling, and as the bar is moved along the bore of the gun, it is slowly revolved, controlled by its slot, and its cutters produce in the gun the helical grooves, or rifling.

Testing the Gun

In the meantime the breech mechanism has been constructed, and is now attached to the gun, which completes it, ready for proof. This consists of examination of the gun immediately before its firing, the firing of five rounds, and a subsequent examination of the gun. If the firing has developed no defects, either in workmanship, material or performance, the gun is accepted.

The machine work alone in the manufacture of a 12-inch gun consumes 850, 10-hour days, requiring 195 different machines, and in all about 500 men performing some operation in its course of manufacture.

The manufacture of armor-piercing projectiles is essentially a metallurgical problem, combined with an elaborate system of heat treatments. The projectiles are made of alloy crucible steel, individually-cast, forged, machined and heat treated, the treatment being especially prescribed for each projectile, depending on its known chemical composition. The proporties desired are those of extreme hardness on the point for penetration qualities, with a gradual decrease in hardness in the main body and toward the base of the projectile, to a very tough and fibrous condition, for the purpose of withstanding the shock of impact, and thus protecting and keeping intact the cavity provided in this portion of the projectile for carrying the high explosive charge.

The acceptance of projectiles is based entirely on the results of ballistic trials, consequently the method and process of manufacture is left entirely optional with the manufacturer, so all the testing during the course of fabrication has but one object in view, namely, the placing of the material in a physical condition to meet the ballistic requirements.

For this ballistic test the projectiles are grouped in lots of 500 each, and when the full number comprising a lot have been satisfactorily treated to a desired physical condition, the lot is submitted to the government

inspector, who selects from it three projectiles for the ballistic trial. To successfully pass test and constitute acceptance two of the three must pass through a Kruppized, face-hardened armor plate of the same thickness as the diameter of the projectile, without breaking or having cracks extending into the cavity provided for the high explosive charge. The projectiles in this test are fired at a velocity approximately 300 feet per second higher than in the corresponding armor plate test.

Having passed test, the projectiles then are ground smooth where they come in contact with the gun in firing, and finally receive the copper rifling bands and soft steel caps. The function of the band is to follow the rifling grooves in the bore of the gun, thus giving to the projectile its rotating motion, which increases not only the length of the flight, but the accuracy as well. The soft steel cap serves to support the point of the projectile at the instant of impact on the hard face of the armor plate, thus preventing the hardened point of the projectile from being broken, and enabling it to penetrate the plate.

It might be of interest to note that a 12-inch projectile weighs 1,000 pounds, and a 14-inch projectile, 1,600 pounds, with a cost for powder and projectile in the firing of one shot, $750 and $1,000, respectively.

The manufacture of armor plate, like projectiles, is essentially a metallurgical treatment process, but with problems as different as are the functions of the two products, they having in common but one feature, namely, that their acceptance depends on the results of ballistic trial.

Steel for armor plate is made by either the acid or basic open-hearth process, and is cast in large, rectangular, sand-lined ingot molds, very heavily sink-headed, the sink-head serving as a tong-hold for carrying and manipulating the ingot during the forging operation, as well as insuring sound steel in the body of the ingot.

The subsequent heating and working of the large masses of alloy steel, requires the greatest care and skill. We have cast ingots for armor plate work weighing as much as 205,000 pounds. Each ingot is forged to the approximate length and width of the finished plate, but to a slightly greater thickness, under a hydraulic press of 14,500 tons capacity. This press is the largest hydraulic machine in the world, and has a working pressure of 7,000 pounds per square inch, and is served by two 150-ton capacity traveling and turning cranes.

Carbonizing the Plate

After forging, the plate is carbonized, this process consisting of covering the face of the plate with a carbonaceous material, and then continually heating it for a number of weeks until the face of the plate has absorbed carbon to a depth of about 1¼ inches, thus giving a plate of steel with one side much higher in carbon content than the other. The plate is then reforged to its finished thickness, this operation being done with such accuracy that, whether the plate be of even thickness or tapered, it is not necessary to machine its face, as is the practice in Europe in order to obtain a clean and even surface.

The next step is to bend the plate to conform to the lines of the ship, or to form the turret and barbette structures, this operation being performed under a 6,000-ton hydraulic press.

The plate is now ready for the various heat treatments, and tempering operations by immersing in both oil and water, through which it is taken until the proper physical condition is obtained, namely, an extremely hard face, undrillable with the best grade of self-hardening tool steels, to a depth of about one-quarter of the thickness of the plate, with the balance of the plate in a tough, fibrous condition.

For ballistic testing, the armor is divided into groups of about 500 tons each, and when all plates of a group have been finally hardened, the government inspector selects one plate to represent the group in ballistic trial. If the plate resists impact of three, capped, armor-piercing projectiles, of the same diameter as the thickness of the plate, without cracking or penetration, the group is accepted.

The plates are then finish-machined, and erected as they will be placed on the ship, in order to detect and correct any deficiencies in their joints or alignment. The finished plates represent 45 per cent of the weight of the original ingots.

It is obvious that the largest and heaviest kind of machine tools are required for the machining of armor plate. The company has a capacity for finishing 1,000 tons of armor plate per month.

The Buyer From a Manufacturer's Standpoint[1]

By John L Haines

The apprentice is told early in service by his thrifty instructor to do the hardest task first and working on this principle I will have the temerity to say of the buyer that he is largely responsible for many of the manufacturer's troubles. He wants always to buy at minimum prices. He puts on his orders all kinds of instructions and restrictions, adding cost, annoyance and delay to the work and hindering what he should aim to help—the prompt and economic execution of his orders. For these reasons he is sometimes looked upon as an enemy, rather than an ally, when after all such is not the case. This erroneous idea can only be found when one at least of the interested parties has failed to grasp the needs or efforts of the other.

Irregularity of Demand

We all know the proclivity of the hen. When eggs are needed, the queen of the hen coop does not seem to be inclined to work overtime, but when eggs are plentiful most hen yards work as near double turn as nature will permit. The buyer is similarly inclined. His yield of orders is very small when manufacturers need business, but when demand is strong it seems to be the desire of the buyer to order several times over what he is able to use, or the mill or factory produce.

No doubt this irregularity in buying can be attributed partly to the continued rivalry between supply and demand. In the race between these two forces sometimes demand outstrips supply, only to stir supply to greater effort and demand takes second place for a time. When supply is ahead of demand we know in our great country the condition cannot long continue, and at such times some plan of (if we may coin the word) *forebuying* and storage may prove as advantageous to the iron

[1]Presented at the Pittsburgh meeting of the American Iron and Steel Institute.

and steel producers and their customers as the irrigation systems of the world have proven not only advantageous but necessary to desert places.

It may be that the variation in volume of orders is partly caused by the fact that of late years contracts for some steel products are not considered binding when market conditions do not favor the buyer. This subject of contract obligations is a large one and has been previously discussed by the Institute. It is certain, however, that if these obligations were regarded as real contracts, rather than options, and regularly specified against, the volume of orders going toward the steel mills would be more dependable.

Stringent Specifications

Most of us, in the steel business, feel hampered at times by specifications of quality that seem unnecessary or too exacting. No maker of steel does or will object to rigid specifications when the material covered by such specifications is to be used where human life or limb depend on the quality of material. Some buyers have, however, shown a tendency to insist on stringent specifications, when there is no necessity of such severe demands. When an exacting specification is unnecessarily added to an order, it causes trouble without benefit. It behooves all buyers to seriously consider, when adding quality specifications to orders, to avoid, for instance, calling for a sulphur limit of 0.035 or 0.040 per cent in basic open-hearth steel when 0.05 per cent sulphur would do no harm. This also naturally applies to a too low limit on phosphorus, or lack of sufficient spread in carbon, manganese or physical requirements.

Then there is the careless buyer. What a trouble maker he is! In an endeavor to save time when writing orders he adds terms *as before* or *as usual*, thus sowing the seed of trouble, only possibly to reap the whirlwind.

Then there is the unscrupulous buyer who intimates that the product could be of inferior quality, or weights may be reduced, in order to attempt a possible saving. The buyer who maliciously attempts such action can best be compared with a man smoking in a powder factory. He not only endangers himself, but his associates, and while he may be willing to assume such risk, no insurance company would care to write a policy to cover the case.

In trying to point out the mote in the eye of the buyer, we must not overlook the beam the buyer may fancy he discovers in the eye of the manufacturer. Numerous charges are preferred by the buyer against the manufacturer. The buyer says the manufacturer does not look after the quality of his product as he should. He also says that service is not what it should be, and once on the books, orders are not delivered as wanted, promised or expected.

The buyer and seller represent two extremes of business. The words of description are not so different. The buyer wants the best for the money—the manufacturer wants money for the best. The one offers money for material, the other material for money. Now while there is this big distinction between the man who buys and the man who sells, the basic foundation may not be so different. The good buyer is so on account of his training—added to his ability—and we can but think that the man whose training has made him a successful buyer, would have been a good manufacturer had his life work been along that line. There are, no doubt, inborn traits particularly adapted to certain development, but it is chiefly environment and training that make one man a buyer and another a manufacturer.

Fair Dealing

Many of the indictments against the buyer are exceptional and the same can be said of counter charges against the manufacturer. There should, must be and is a plane on which buyers and manufacturers can meet and do business in comfort and satisfaction. It is the plane of *fair dealing*. A few thoughts may aid us to reach this plane. Summarizing some of the ideas already expressed, let the buyer suit his exactions to the necessities. Let him not demand the impossible, or even unnecessary. Contract obligations should be respected by both buyer and seller and should be so written as to be fair to both. All orders and contracts should be as brief as law and sense will allow. The best firms today usually have the simplest forms. Never, however, should clearness be sacrificed for brevity. One of our famous editors of years ago gave orders to his force concerning certain words that must never appear in his paper. The buyer of today should issue similar instructions regarding the use when writing orders of short-cut phrases, such as *as usual* and *same as before*. Such terms should never appear on orders. If necessary to refer to previous details, the reference should be specific, not general.

In meeting buyers, the salesman is usually the manufacturer's representative and much effort has been expended to educate the young salesman. The importance of the salesman's training is self-evident, as an inexperienced salesman will frequently do more harm than the proverbial *bull in a china shop*. The buyer also needs special training. If it is wise for the salesman to know how what he sells is made and to be used, it is as wise for the buyer to know not only how what he needs is to be used, but in a general way how it should be made.

Suggestions for the Manufacturers

There are several suggestions to be borne in mind by the manufacturer. Quality is of pre-eminent importance. No high grade concern can afford a reputation of deliberate inferiority. There may be different grades of material but, given the grade, no manufacturer should be satisfied except when making quality equal to any of the same grade.

Then there is the element of efficient service. In many products of America the tonnage figures are almost awe-inspiring. Satisfactory and efficient work in filling orders is of prime importance and it is being learned that efficient service can be rendered without sacrificing production.

Buyers and sellers are after all a species of Siamese twins; one cannot exist long without the other. They are as necessary to each other as capital and labor. Just as surely as labor cannot exist without capital, or capital succeed without labor, so surely are buyer and seller dependent on each other. Much advantage to both can be gained by mutual knowledge of the real conditions governing the requirements of the buyer on the one side and on the other the limitations of the seller or maker, in meeting these conditions in a commercial way. Matters are at their best when buyers are content and manufacturers busy. The strongest factor to bring about and maintain such conditions is *fair dealing*. The best buyers today are square in their dealings, and continued success of a manufacturer can only be achieved by maintaining a like attitude.

Thus from either standpoint it can be demonstrated that "Honesty *is* the best policy." With this great principle ever before us, let *fairness* be our watchword, *efficiency* our aim, *perfection* our goal.

MEN OF THE IRON TRADE

Harrison Weymouth has attached himself to the New York office of the Pennsylvania Steel Co., 71 Broadway, as a salesman.

S. G. Pierson has been elected a director of the Colorado Fuel & Iron Co., Denver, Colo., succeeding the late Edwin Hawley.

E. W. Edwards, president of the Edwards Mfg. Co., Cincinnati, has returned from a brief vacation at French Lick Springs, Ind.

C. M. Schwab, president of the Bethlehem Steel Corporation, returned to New York, Oct. 25, after having spent several weeks in Europe.

James N. Hibbs, secretary of the Hooper & Townsend Co., Philadelphia, who has been quite ill, is now pronounced to be on the road to recovery.

C. W. Lytle, formerly manager of the Sharon, Pa., plant of the American Steel Foundries Co., has accepted the position of manager of the Wheeling Mold & Foundry Co., Wheeling, W. Va.

Samuel A. Benner, assistant to the president of the Pittsburgh Steel Co. for the last two years, has resigned. He is contemplating a trip to Europe, after which he probably will enter business for himself.

John H. Rennard, well-known advertising manager in the iron and steel trade, has opened a branch office at 1403 Oliver building, Pittsburgh. The main office at Wheeling, W. Va., will not be abandoned.

H. E. Storey has been appointed manager of the Toronto office of the Goulds Pump Co. of Canada, Ltd., successor to the Goulds Pump Co. This concern handles a complete line of power, centrifugal and turbine pumping machinery.

Thomas F. Wheelright, president of the Old Dominion Iron & Nail Works Co., Richmond, Va., has been elected president of the Virginia Railway & Power Co., to succeed William Northrup, who was killed in an automobile accident last summer.

C. A. Stillman, Chicago, has been appointed general manager of the Iroquois Iron Co., South Chicago, succeeding Samuel Kennedy, who recently resigned. E. L. Ives succeeds H. R. Norris, resigned, as general superintendent and H. A. Bruce has been appointed successor to assistant general superintendent George Zinc, resigned.

Professor Clarence P. Linville, after a service of nine years in charge of the department of metallurgical engineering, and as professor of metallurgy at the Pennsylvania State College, has resigned to accept the position of superintendent of blast furnaces with Joseph E. Thropp, and is now located at Earlston (Everett P. O.), Bedford county, Pa.

Arthur W. Pope was re-elected chairman of the Pope Mfg. Co., Hartford, Conn., at the recent meeting of the board of directors. Other officers, all re-elected, are president, Albert L. Pope; vice president, Charles E. Walker; treasurer, George Pope; assistant treasurer, E. M. Cutting; secretary, W. C. Walker; assistant secretary, H. A. Leinhard; comptroller, G. T. Morrow Jr.

John B. Smiley, who has been assistant sales agent of the Pennsylvania Steel Co., at New York, has resigned and will locate at Edmonton, Alberta, Can., where he has organized the Builders Supply Co., Ltd., to do a general contracting business. The change is effective Nov. 1. Mr. Smiley has been succeeded in the New York office of the Pennsylvania Steel Co. by Thomas B. Blagden Jr.

J. B. Bernhard, manager of manufacture of the Pierce, Butler & Pierce Mfg. Co., Syracuse, N. Y., has resigned to engage in the manufacture of a new type of house-heating boiler, patent for which was recently granted. Mr. Bernhard is endeavoring to make arrangements with a gray iron foundry to manufacture this boiler. His present address is 618 W. Genesee street, Syracuse, N. Y.

Harry Bronner, of Hallgarten & Co., New York, was elected a director of the American Locomotive Co. at the annual meeting held at New York, recently, succeeding Chas. Miller. The other directors were re-elected. Mr. Bronner, it is understood, goes into the board to represent foreign interests, which until recently had made no effort to obtain representations among the directors.

E. W. Sorreng, a graduate of the South Dakota State college, who has been an instructor of electrical engineering at Center college, Danville, Ky., has been appointed assistant professor of electrical engineering in the college of engineering of Marquette university, Milwaukee, Wis. Mr. Sorreng has had two years or more of practical experience in the Allis-Chalmers works at Cincinnati and Milwaukee.

Thomas X. Fitzgerald, formerly superintendent of the Tudor works of the Republic Iron & Steel Co., at East St. Louis, Ill., and since July 1 night superintendent of the Mahoning Valley works, Youngstown, O., of the same company, has been appointed general labor foreman by general superintendent Oscar Black. He succeeds M. J. Regan, who has been made superintendent of the Hannah furnace, Youngstown, vice Robert McGlurken, resigned. Mr. McGlurken has accepted the position of superintendent of blast furnaces of the Northwestern Iron Co., Mayville, Wis.

F. C. Schwedtman, who, with J. C. Lund, recently purchased the controlling interest in the Racine-Sattley Co., Racine, Wis., has been elected president and general manager of the company. Mr. Lund has been chosen secretary and treasurer. Logan Hay, who has been vice president, remains in that capacity. H. E. Miles, George A. Yule and A. F. Austin retire from the company. The general offices have been moved from Racine to Springfield, Ill., where the principal branch factory is located.

L. L. Jewell, who went to the Isthmus of Panama two years ago to prepare for the McClintic-Marshall Construction Co., Pittsburgh, its bid for the construction of the lock gates, and has been in charge of the erection since its beginning, in May, 1911, has been succeeded as local manager by W. M. Sterrett, manager of the company's manufacturing plant at Pottstown, Pa. J. C. Childers will be associated with Mr. Sterrett as superintendent of erection. Mr. Jewel resigned from the service of the company to become president and chief engineer of the Central American Construction Co., a corporation recently organized, under the laws of the republic of Panama, to carry on a general contracting business.

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The Steel Suit a Year Old

Last Saturday the suit of the United States against the United States Steel Corporation became a year old. It is a trifle hard to realize the fact. When the suit was brought, it was said that it would probably take a couple of years to secure a final adjudication, and that seemed like an interminable time to wait, but one whole year is now past, and it is certain that nobody's patience has been tried at all, and not even that of the lawyers, one may feel fairly confident, for the lawyers are used to that sort of thing.

In fact, the steel trade has had no time to think about the suit. Steadily since the suit was brought, the iron and steel market has improved, not because of the suit, but apparently indifferent to it, just as prosperity has ignored many other features of a period of agitation and politics.

A year after the suit was instituted, men's thoughts ought perhaps to be turning more than they are to what will be the outcome, but there seem to be no views on this subject which are at all clear. Now and then the opinion is hazarded that there will be "segregation", chiefly between transportation and manufacturing, but such an outcome is not to be considered very seriously, when it is observed that in the first place it would not materially set the Corporation back, for the public already has power to regulate the transportation lines, through the Interstate Commerce Commission, while in the second place it would place the law in an interesting position with respect to many independent iron and steel manufacturers, who also have transportation lines as a natural and normal part of their business.

Perhaps the absence of clear views as to what will occur is due to the fact that the case is one which requires administration rather than interpretation of the law. Should it be concluded that things were done, years ago, contrary to the law as it existed, the fact that no prosecution was instituted may admit into the reckoning the fact that the Steel Corporation has greatly changed its form; it has become a "scrambled egg", which Mr. Morgan suggested could not be resolved into its original condition. It may then turn out that the adjudication of the case will be largely with an eye to what the legislative branch of the government will have done towards solving the question of the trusts. Three parties are seeking the reins of government, each with a rather vaguely outlined program for dealing with the trusts. Before the Steel suit comes up for final settlement, one of these parties will presumably be in power and will then have been forced to outline its program more clearly.

The Iron and Steel Institute

The Pittsburgh meeting of the American Iron and Steel Institute has furnished abundant reason for hoping that this organization will in time be as great a power in this country as the Iron and Steel Institute is in England and, in fact, in the world. With the limited and exclusive membership which characterized the first meetings of the new organization of iron and steel manufacturers, it could not be expected that the achievements of the Iron and Steel Institute would be approached, but with the enlarged membership, including many young men, of marked ability, it was not a difficult matter to prepare a program which was thoroughly creditable to the iron and steel industry of the United States. The papers were of a very high grade, but some of them were too long and the delivery in one or two cases was very poor. The discussion was unfortunately limited to the reading of three formal papers. At future meetings, if members of the Institute are given to understand in advance that discussions will be welcome, there will probably be a freer expression of opinion. Some of the methods adopted by older associations of this character, such as the Iron and Steel Institute, might well be followed in developing discussion of papers.

Judge Gary was entirely right when he said that neither technical subjects nor strictly business topics can be considered as all-important, or the most important subjects which must be considered and passed upon by the members of the Institute. Economic problems of the greatest importance must be confronted and sociological topics cannot be ignored, if the American Iron and Steel Institute is to be the real power that it ought to be in advancing the cause of progress. Probably it was the part of discretion not to attempt at the close of a presidential campaign to discuss questions which are so deeply involved in partisan affairs, but after the smoke of the political battle clears away, manufacturers, all of whom are deeply interested for their own welfare and for that of their employes, in the solution of the great problems of the day, should be given a chance, especially in their own associations, to present their views.

Reaching Out For Trade

The criticism has often been raised against American manufacturers that their occasional efforts to find a place for their products in foreign markets have been impelled only by temporary expediency and have lacked the vigorous enterprise and zealous attention that are commonly given to the needs of their customers in the home markets.

Such comment upon the sporadic reaching out for export orders by the American manufacturers is well founded in fact. More often than not, the home

manufacturer has looked upon trade opportunities beyond the borders of the country as affording contestable territory far heavier only in times of a dull domestic market and as representing a dumping ground for surplus product rather than a permanent source of orders and profits. In most cases, these efforts have only been of a temporary periodical character and they have lacked the cementing bonds between buyer and seller of familiarity and confidence based upon a continued and mutually desirable relationship.

There are some striking exceptions to this attitude of American manufacturers, to be seen in the huge and expanding export trade of such large companies as the United States Steel Corporation, the International Harvester Co. and others, which have laid their policies along the line of not only capturing foreign business, but of taking care of it once they had gained it. This seems to be the secret of export success where it has been most notable in this country, for at all times these manufacturers have shown a genuine appreciation of the patronage of their foreign customers, to whom they have given the benefit of a careful and studied service. Contrary to the general impression, the results in the way of profits have more than justified the effort expended, not to speak of the incalculable value of the steadying influence upon productive operations by a broadened market at all times.

American manufacturers today are very manifestly inclined to give more and more serious attention to the extension of their foreign trade and with the approaching completion of the Panama canal and the present revival of American shipbuilding, the psychological moment seems to be near at hand for putting this mental attitude to effective expression. The machine tool builders of this country are apparently among those manufacturers who have heard the new note in the commercial life of this nation calling them to assume a more staple position in the world's market. At their recent annual convention in New York they devoted much of their addresses and discussions to the general topic of export trade and took several actions shaped to develop a broadening of the demand for their machinery from foreign buyers.

W. A. Viall, in his paper at the New York meeting, squarely presented the question whether export business is to be considered a splendid thing in bad times, but a nuisance in good times. The plain fact is that the foreign business will not increase to any large extent unless the manufacturers give it continuous, intelligent effort. Mr. Viall's paper abounds in pertinent suggestions of how the export trade can be improved. An imperative necessity is for exporters to have reliable information of conditions existing in foreign lands. Foreign customers must not be neglected in order that the domestic trade may be promptly served. Custom regulations of lands across the sea must be respected. Americans cannot insist that foreign customers must learn the English language. Americans must become more familiar with foreign languages. Mr. Viall points out that fully as much effort is necessary to satisfy foreign buyers as to please the trade in this country.

A practical step forward was taken in the adoption of the suggestion set forth by S. H. Bullard in his paper on "The Use of an Association Catalog for the Development of Foreign Trade". Mr. Bullard said that advertising in trade journals offers an efficient means of arousing interest among foreign buyers, but in many advertisements are found offers to send to those interested more detailed information. This can be done in the form of a catalog, but the catalogs of the different companies do not meet the requirements. Each book deals with one subject and does not give the wide range of information which is needed by the foreign buyer. "The solution of the difficulty," said Mr. Bullard, "lies in the fact that we are associated, and that what is out of the question for each of us as an individual, is, through a combination of effort, easily made possible." He predicted that a catalog issued by members of the Association would prove a veritable mine of information for shops the world over and would be looked upon by speculative purchasers of equipment as an authoritative work on the subject because of the prestige which is already connected with the name of the Association. The results of this associated effort in catalog work will be awaited with much interest.

All these efforts are in the right direction. They bespeak the stirring of that quality of American commercial enterprise, at which the world has marveled along the lines of a greater and broader market. There can be no doubt as to the result of an intelligent persistence in this policy and with it will come the development of a national character, more liberal in its economic concept and more independent of the factor of the tariff.

Railroad Equipment

Poor's railroad statistics, just issued, show the equipment of the standard steam railroads of the United States at the close of their fiscal years 1911, the fiscal year in some cases having ended June 30, 1911, and in other cases Dec. 31, 1911. Approximately this was at the close of a period of lean railroad buying, and just before the much heavier building of cars and locomotives in progress for ten or twelve months past. The figures, compared with those for previous years at five-year intervals, are as follows:

	Cars.	Locomotives.
1891	1,194,130	33,563
1896	1,278,460	36,388
1901	1,445,283	39,729
1906	2,025,858	55,439
1911	2,408,589	65,310

The increase in equipment from 1891 to 1901 was very small. The general industrial depression was 1893 to 1898, inclusive, but the railroad position became bad before 1893, while it improved just before 1901. From 1901 to 1911 there was very much greater increase in equipment than in the preceding decade, but the larger portion of the increase, about 60 per cent, was in the five years from 1901 to 1906.

In 20 years, the number of both cars and locomotives has practically doubled. The service rendered has more than tripled, for there are statistics showing that comparing 1891 and 1911, the passenger movement—passenger miles—was multiplied by 2.5, while the freight movement—ton-mileage—was multiplied by 3.2, the latter being, of course, by far the more important. Cars and locomotives have increased in capacity, and their movement has been made somewhat more rapid. The average number of passengers per train has increased from 45 to 58 and the average freight train load from 165 tons to 403 tons. This is what has enabled the railroads to get along with no increase in rates when wages and commodities have advanced.

What is the Matter With American Export Trade?[1]

Importance of Maintaining the Highest Standards—Practical Suggestions of Methods of Improving Relations With Foreigners

By W A Viall[2]

Neither our own nor any other country can or should have all of the business in machine tools. As our lines develop, there is no question that one foreign country may excel another and ourselves in a given line of development, and when such a fact is realized, we should be as open-minded and as ready to purchase as we are to desire others to consider and purchase from us.

As a people, we sometimes pride ourselves on our business spirit of push and get there. So much have we talked about it that some of our foreign competitors have become so imbued with the fact that they call us not only aggressive, but egotistical, tricky and even brutal in competition.

We admit we try to be aggressive, denying the remaining allegations as being too strong, but when we study the methods of some of our foreign competitors in working for export trade, we wonder if we are aggressive even, and our wonder increases as we compare foreign export figures with our own. Are we inspired with the possibilities before us, and willing to add perspiration to inspiration?

Export business is no different from any other business in its principles. In our domestic trade there is no lathe nor milling machine tool builder who does not take such steps to sell his goods as will cause them to be purchased rather than the goods of a competing lathe or milling machine manufacturer. In such a case, the manufacturer studies the market, and does what he considers is necessary to interest the prospective customer and to take the order.

In export business, instead of dealing with a neighbor who lives within a shorter or longer distance from us, speaking the same language and living in the same general atmosphere of business and social conditions, we are dealing with a competitor who, except in the case of the English, speaks another language, and all of whom live under conditions of life and are inheritors of business priciples and methods that differ from our own.

What do we do to get domestic business? We try to get designs that are satisfactory, designs for which there is or for which there can be secured a demand. We try to offer workmanship that is of a high order, and if we are now dealing with competitors who have equally good designs and equally good workmanship, we sometimes feel that by manufacturing more cheaply we can sell more cheaply and thus obtain a market.

Methods of Selling

To sell goods abroad there are different courses open. The sales can be effected through agents who will act as your representatives, through direct travelers, or through general agents who are but little more than commission merchants. There are representatives, and representatives. If you sell through a representative who is thoroughly in sympathy with you, who will work for your interests, who will represent you and you alone in your line, you then are in a position to reciprocate and work for him. Such a representative must be taken into your confidence; you must listen to his requirements, and while it is by no means possible to grant all of the requests that such a representative makes, it is possible to get from him a point of view of a character that will help you in obtaining a share of the business that you are seeking. While selling through such a representative you are dealing with a concern the staff of which know the people with whom they deal, know their peculiarities and can more readily make a trade than through a direct representative. To think of sending a direct representative who cannot speak the language is so far from anything that any of us would think of doing, it is hardly necessary to discuss this feature of the question. But given one who understands the language, as a direct representative he has to meet conditions that it is not easy for the home people to understand, so that it almost precludes this form of representation. When, however, you second the efforts of your representing agents with the services of a direct representative, results are oftentimes then obtained that make such services an imperative necessity. This element is one that cannot call forth positive rules. If your machine is a type of special machinery, the need is far greater than when it is a type of standard machinery, and where to draw the line is a matter of private opinion.

An Imperative Necessity

When goods are sold abroad through representatives, it is an imperative necessity that the house selling should have first-hand knowledge of conditions existing in their foreign trade. Your agents will write until they are black in the face and get no response from you, when did you but know a little of what they are contending with, one letter would have sufficed to place matters in order.

From personal visiting we will have something of an idea of what it means to have our literature in the language of the people that are to use the goods. We spend large amounts of money on our domestic business, upon circulars and all manner of printed material, but are apt to hesitate at printing in a foreign language when we are looking for the export business. We are also apt to neglect the placing upon these machines of plates, giving instructions as to the handling of our machines, worded in a foreign language.

This brings up the matter of correspondence. Are we as apt to be as prompt in answering our foreign correspondents as we are our domestic friends, especially if they are not more than a hundred or two hundred miles away? Aren't we a little apt to think, "Well, he has been waiting for ten days, a day or two will make no difference," rather than to think, "He has been waiting for ten days and how tedious it must be to have to wait another ten days, therefore, this letter will be answered ahead of our New York letter." As a general rule, do we watch the sailings of the mail-ships as closely as the foreigner, and attempt to make certain that given letters and docu-

[1]Presented at the meeting of the National Machine Tool Builders' Association, Oct. 16.
[2]Secretary of the Brown & Sharpe Mfg. Co., Providence, R. I.

ments reach New York in time to make the best connections?

Have not some of us felt the export business was a splendid thing in bad times, but a nuisance in good times? Haven't we been rather apt to give, not a just delivery to our foreign friend, but to give him the delivery that was left over after our domestic friends were taken care of? When we are called upon to put up some special form of packing to meet certain conditions, do we not feel that our representative is perhaps a little over particular, if not cranky, and make him feel that what is good enough for us is good enough for him, rather than to attempt to judiciously follow his wishes? Do we visit our representatives or have them visit us so often that we can talk over the things that are going on and become more closely allied? If we do, we are backing up our representative as thoroughly as we are backing our own salesman on our own ground, and when we do not we are playing with our foreign business.

The United States is not the only country that has customs regulations. We find that foreigners take the utmost pains to conform to our American customs requirements, when exporting goods to this country; but when we export to their country, are we not rather apt to consider it more or less of a nuisance to carry out in detail the requirements of those countries, and work half-heartedly, with the result that the receiver of our goods abroad is put to such trouble that he will prefer to buy from the foreigner who meets him rather than from the American who holds off?

National Feeling

In the case of a foreigner, we find that he goes into neutral territory, and we are informed that he will give preference to the foreign over the domestic business. While this may be hard on his domestic customer, yet there is a national feeling at times that makes them think that they can handle their home trade rather differently than their foreign trade, to the advantage of their home trade, on the theory that they are building up their nation. Our country has not been noted, in the machine tool business at least, as being willing to use foreign countries as dumping grounds of our manufactures in the way of prices, charging all of the overhead to domestic and figuring the prices of the export at flat labor cost without overhead; but this is a thing that we are meeting in competition in foreign markets.

Wages are an important element in cost, but they are not standing still abroad. There are those who want to see lower tariffs, which will mean lower cost of living and lower wages, and then perhaps there will be a competition that will be carried forward on a basis we have not yet been able to attain.

We have one difficulty in getting into European markets that our European competitors do not have, in that we have a great distance to travel, and this oftentimes prevents our sending men and lessens the number of visitors—conditions which do not prevail among European manufacturers. When the South American and the far east markets are considered, however, then they have as far to go as we have.

Inherited Traits

Many of us are of English descent and have inherited some of the English traits. The matter of language is one of them. How often we hear the American saying that the English language is good enough for him and let the other fellow learn English. When we go abroad, we find people that are speaking English up and down the line. Most of us are acquainted with the young men who come to America for the main purpose of learning English (and, incidentally, to learn some of our methods), and then in turn become the men who are doing the business. A knowledge of foreign languages is not an absolute necessity for the export business, but it is certainly one of the advantages that those who possess it have, and this is a bit of practice at the hands of our competitors that we could well bear in mind, and consider if it would not pay if more of our young men were sent over, if for nothing more than to acquire one or two of the languages of countries where we want to do business.

If we follow closely some of the literature of other countries we find some of them are banding together with a spirit of co-operation that is not always evident in our own country. One of the purposes of our association is to draw together manufacturers, so that we can act as a whole, bringing ourselves together so that we can go forth as a body of American manufacturers rather than as individuals—and results have already appeared in this direction.

When we contemplate that in the year 1911 the United States exported to Italy, in metal and wood-making machinery, 1,000,000 kilograms and Germany 6,000,000 kilograms; in 1910 America exported machinery into Switzerland to the extent of 500,000 francs and Germany 4,000,000 francs, or one to eight, and in 1909 America exported into France machinery only to the extent of 45,000,000 francs, and Germany 110,000,000, or one to two and a half, it is quite time that we carried into effect as individuals, and, when necessary, as an association, that attention to the details, to the necessities and to the desires of the foreign customers that we are giving to our domestic customer every day, and think it but a part of the day's work when we do it.

Considering the above figures, it goes without saying that we must constantly maintain the highest standard of design and workmanship. But beyond this, what is the matter with our American export trade? Are our goods not fitted to the foreign market, or are they not properly presented to the buyer, or are the prices too high?

Cambria Moves Some Offices

Pittsburgh, Oct. 29. — The Cambria Steel Co., Johnstown, Pa., will move the offices of the traffic manager and purchasing agent from Johnstown to Pittsburgh, it was announced this morning by William H. Donner, recently elected president of the company. Mr. Donner will occupy offices in the same suite. The Pittsburgh offices will be located on the eighteenth floor of the Oliver building. There will be 14 rooms included in the suite. The space was sub-leased by the Republic Iron & Steel Co., the main offices of which were moved from this city to Youngstown about a year ago.

F. C. Yeates is purchasing agent of the Cambria company and William A. Sproul is at the head of the traffic department. W. McClain, Pittsburgh sales agent, will transfer his offices to the eighteenth floor.

Suspends Rate Advance

The Interstate Commerce Commission has suspended from Oct. 29 until April 29, the advance in the rates on pig iron from points in northern Michigan and Minnesota to Kansas City and other destinations. This suspension was necessary in order that the investigation into the reasonableness of the advance may be completed.

American Iron and Steel Institute Meets in Pittsburgh

Judge Gary Declares All Questions Must Be Settled on Basis of Justice—Valuable Papers Read—Moving Picture Exhibition

(From Judge Gary's Address.)

The thought I would leave with you is that there is no way of permanently settling any great question involving the welfare of humankind except on the basis of right and justice. Position, wealth, influence, laws are helpless as a means of establishing a rule for human conduct unless supported by principles of justice and righteousness. The unfair or unreasonable or dishonest man, whether in public life or private life, may succeed temporarily; but it is only a question of time when he will be discovered and overthrown. The members of this institute have, and will continue to have in an increasing measure, great influence in the solution of the problems of today and the future; and you will give good account of yourselves. In our daily walk and conversation, in our attitude and demeanor toward all with whom we come in contact, each of us must be certain he is governed by motives which are honorable and just. You have made and are making great strides in the direction which I have indicated. You have secured and will hold the respect of all who know you, and, better than that, you have the approval of your own consciences.

With nearly 400 of its 750 members in attendance, the American Iron and Steel Institute met in Pittsburgh on Oct. 25 and 26 for its third general meeting. The weather was rainy and otherwise disagreeable, Friday, but this did not affect the spirits of the members, who combined in making this the most spontaneous and enthusiastic meeting, as well as the largest, so far held by the Institute. Particular significance attached to the Pittsburgh meeting since it was the first to be held away from New York. In view of the complete success which resulted, the directors of the Institute will undoubtedly continue the policy of occasionally selecting other western and middle western cities as meeting places in the future.

The members present were as representative a body of those who have been elected to shape the destiny of the iron and steel industry as it is possible to find. Leading officials of all the important companies and a large number from the smaller ones were on hand in great numbers and these men intermingled freely in the halls and corridors of the Hotel Schenley, the headquarters of the meeting. In fact, the spirit which pervaded the gathering truly reflected the idea fathered by Judge Gary, that the purpose of the Institute should be to elevate the entire iron and steel industry through the friendly relations existing among its members and their willingness to co-operate with each other in the exchange of information.

Judge Gary's Greeting

The meeting was opened on Friday by Judge Gary, who preceded the president's address with a few informal remarks.

"It is a very great pleasure," he said, "to meet you here. Episodes of this kind are a great source of happiness to me. There are so many members present that I am sorry to have to admit that I do not remember each one of you by name. I suppose that is a sign of advancing age. I trust that you will not take any exception to this, as I assure you that I feel the sincerest friendship toward everyone here."

Two sessions, which were devoted entirely to the reading of papers by various members and the opening address by Judge Gary, took up most of the day on Friday. During the recess between the two sessions, the members were served a buffet lunch. Judge Gary, in adjourning the morning session, said that while he was not familiar with the mechanical construction and the chemical analysis of the lunch, he was quite sure that "it would keep all the mills going." This, it may be remarked, the lunch proved entirely capable of accomplishing.

Papers Read

The papers, eight in number, which were read during the two sessions on Friday were of a very high quality. Judge Gary remarked that a feature of these papers was the wealth of detail into which the authors entered in describing processes and methods which have hitherto been regarded by manufacturers as secrets to be withheld from each other. Judge Gary congratulated the authors on the frankness in disclosing this information, as well as on the excellence of their papers.

The papers presented at this meeting of the Institute, and their authors, were as follows: "The Buyer, From the Manufacturers' Standpoint," by John L. Haines, assistant to the vice president, Jones & Laughlin Steel Co.; "The Technical Training of Salesmen," by James M. Camp, of the general sales department, Carnegie Steel Co.; "The Use of Mayari Iron in Foundry Mixtures," by Quincy Bent, assistant to the president, Maryland Steel Co.; "The Manufacture of Ordnance at the Bethlehem Steel Works," by E. G. Grace, vice president and general manager, Bethlehem Steel Co.; "Coal Mine Ventilation in the Connellsville Coke Region," by Austin King, chief mine inspector, H. C. Frick Coke Co.; "Recent Developments in the Preparation of Iron Ores," by J. W. H. Hamilton, mining engineer; "Microscopic Analysis of Steel Sheets," by C. Arthur White, American Sheet & Tin Plate Co., and "Electric Power Production and Distribution in Steel Works," by Stewart C. Coey, engineer, Youngstown Sheet & Tube Co. The discussion on Mr. Camp's paper was by Eugene P. Thomas, president United States Steel Products Co.; that on Mr. King's paper by Wilson A. Luce, general manager Ellsworth Collieries Co., and that on

Mr. Coey's paper by B. R. Shover, of the Brier Hill Steel Co. Several of these papers are published elsewhere in this issue of THE IRON TRADE REVIEW. Others will be published later.

Judge Gary's Address

The opening address by Judge Gary, president of the Institute, was as follows:

"The city of Pittsburgh is an appropriate place for this meeting. It is the center of the iron and steel industry of this country, and in this line of business activity its influence is felt in every country of the world. The Pittsburgh district, confined to the city and its immediate surroundings, produces about one-third of the iron and steel manufactured in the United States and about 13 per cent of the total production of the world. With its natural advantages and location, which tend to reduce the general cost of assembly, production and distribution to the minimum, it is safe to conclude that in the future, as in the past, its commanding position as a steel center cannot be questioned. Much might be said, and would be said if time permitted, favorable to the reputation and active strength of this great city concerning all that makes for the betterment of the human race.

In the Midst of Prosperity

"And we are here under conditions that are most gratifying. We are in the midst of an era of prosperity never before surpassed so far as it affects our particular lines. These conditions have not resulted from the application of political policies or efforts, but exist in spite of them. They are here because nothing could prevent. In the first place, for the last few years, following the bankers' panic of 1907, there has existed a feeling of uncertainty and a lack of confidence, which have deterred the great purchasing public from entering the market, even to the extent of supplying their necessities. This has been especially true of the railroad companies, which are amongst our largest patrons. In consequence, the necessities of the consumers have piled up to such an extent that they have lately been forced to increase their purchases materially. When, therefore, the railroad companies and others similarly situated commenced to buy, the general influence and effect were immediately felt, and buying on a large scale has developed. Moreover, the bountiful crops and sound basic conditions of the country have made everyone realize more clearly than ever before that prosperity in this splendid country of ours is to be the rule and not the exception, notwithstanding at times we may be surrounded by adverse influences and unwarrantable interference, which in any ordinary country would bring prolonged distress and suffering. So we are happy today in the knowledge that we have on our books orders which will keep our mills running to their full capacity for months to come. Let us hope and pray that nothing shall be done to interfere with our continued success.

"We have for the day a program which will afford us great pleasure and benefit. Those of you who were present at the annual meeting of the institute held in New York during the month of May were probably greatly surprised and greatly entertained by the papers which were read on that occasion. It is doubtful whether any similar institution ever held a meeting at which so many addresses of equal merit were delivered. It seemed to all of us present that so long as we could boast of a membership including men of the character, learning and ability of those who spoke, our institute could be depended upon to occupy and maintain a position of the highest rank in associations of this kind. I am sure we are to have a similar experience today. It is safe to say in advance of the delivery of the addresses to be made that they will show a breadth of learning and thought which will demonstrate that this great industry in the United States is in charge of men who are fully competent to compete successfully with the learned and skillful men of other nations, all of whom are our friends and yet are most vigilant and successful competitors. It is a great honor, and certainly a great pleasure, to be a member of this institute and associated with such men.

"But neither the technical questions connected with, nor even the material growth of, our business should be treated as the all-important, or the most important, subjects which must be considered and passed upon by the members of the institute. Questions of great magnitude and concern are at present agitating the minds of the people throughout the world. We may be stubbornly oblivious to some of them, but we ought not to be. We refuse to consider, or at least postpone consideration of, many of them. The questions are international, national and domestic; and they involve the welfare of everyone. We are disposed to wrap around ourselves the cloak of self-righteousness; or we proclaim that we rely upon the stability of government or the majesty of the law; and we consider ourselves safe, whether within our vision everything seems to be calm and tranquil, or otherwise. We sometimes forget that it is the masses of the people who determine final results; that they may establish and abolish governments; that they may make and unmake constitutions. Sooner or later they bring about conditions satisfactory to them, even by resorting to destructive measures. They have the might and they can determine for themselves what is the right. They believe in the sentiment, to quote from a French writer on French history, that "there is a big-

Badges Looked Like Money

The happy faculty of clothing formal announcements in a garb of humor is possessed in a more than ordinary degree by James T. McCleary, secretary of the American Iron and Steel Institute, whose remarks during the Pittsburgh meeting were provocative of much laughter. Mr. McCleary told how early on Friday morning a member of the Institute approached him and, noticing Mr. McCleary's badge, inquired whether these badges were designed for the use of the officers only or for the "ordinary" members as well. Mr. McCleary assured him that the badges were meant for all the members, whereupon the inquiring one wanted to know whether he might "spend" the badge after the meeting.

The badges were handsome bronze discs on which were engraved the emblem of the Institute, the disc being attached to an orange and black ribbon. Mr. McCleary said that a question which had been asked him a number of times that day was, "Why did you select the Princeton colors?" Mr. McCleary stated that he wished to assure the members emphatically that these colors bore no political significance whatever and that orange and black in this case represented only the civic colors of Pittsburgh.

otry in politics as well as in religion, and it is the worst of bigotry to reject change as something which is inherently bad. Laws to be permanently useful must vary with the varying condition of man.

Right and Justice Will Prevail

"I am dealing in generalities, not intending to be specific or to make personal reference. The thought I would leave with you is that there is no way of permanently settling any great question involving the welfare of humankind except on the basis of right and justice. Position, wealth, influence, laws are helpless as a means of establishing a rule for human conduct unless supported by principles of justice and righteousness. The unfair or unreasonable or dishonest man, whether in public life or private life, may succeed temporarily; but it is only a question of time when he will be discovered and overthrown. The members of this institute have, and will continue to have in an increasing measure, great influence in the solution of the problems of today and the future; and you will give good account of yourselves. In our daily walk and conversation, in our attitude and demeanor toward all with whom we come in contact, each of us must be certain he is governed by motives which are honorable and just. You have made and are making great strides in the direction which I have indicated. You have secured and will hold the respect of all who know you, and, better than that, you have the approval of your own consciences."

The Banquet

The banquet given to the members of the Institute on Friday evening, in the Hotel Schenley ball room, was one of the most sumptuous affairs in the history of such events in the iron and steel industry. At a table placed on a raised platform extending along one side of the room, were seated the following: Judge Gary, A. C. Dinkey, W. B. Worth, F. W. Wood, W. H. Donner, J. G. Butler Jr., W. A. Rogers, J. A. Farrell, H. Oeking, E. A. S. Clarke, W. L. King, E. C. Felton, J. A. Campbell, Benjamin Talbot, I M. Scott, Herbert Du Puy, E. G. Grace, Walter Wood, W. B. Schiller. The other members were seated around 34 other tables scattered about the hall. A feature of the banquet was the playing of a large number of well-known songs by a hidden orchestra. Those present joined heartily in the singing of these selections. Immediately following the banquet, Judge Gary made the following speech:

"I feel disposed to congratulate you on the great success of the day. For this we are largely indebted to the efforts of the Pittsburgh local committee, headed by Willis L. King. We have also to thank Mr. Farrell and the others who helped make the arrangements. This success, however, was mainly due to the cordial and enthusiastic help of the members who have so heartily entered into the spirit of the occasion. We have all enjoyed it, both the exercise and the bountiful repast. Especially pleasing were the papers, which were of great merit. Some of the technicalities in the papers were undoubtedly not clear to all. As for me, some of the names were large, if not big. The word 'Mayari', for example, I never before knew how to pronounce correctly.

"We are here today in the interest of the American iron and steel industry, and to advance its real interests in the future. We are here for each other, to enjoy the affectionate friendship of each for the other, and to advance our own best interests by advancing the best interests of others.

"The Institute is very influential. We, the iron and steel manufacturers of the country, are recognized not only as members of a successful industry, but as types of the best citizenship of this country. And we are advancing our best interests by the recognition of our own high standing.

"I congratulate you all for keeping the steel industry on as high a plane as that of any other industry in the world, and for keeping yourselves on as high a plane as any other class of men in the world.

"I beg to express my grateful appreciation, in behalf of the directors, for your support in advancing the status and good of the Institute."

Moving Pictures

Following the banquet, the lights were lowered and a moving picture exhibition, entitled "From Mine to Molder", was thrown upon the screen. This consisted of a series of moving picture films showing the various stages in the manufacture of pig iron and steel, beginning with the ore and ending with the finished product. The films included views of iron mines on the Lake Superior ranges, ore docks and vessels, blast furnaces, steel works, etc. Especially remarkable were the views showing the operation of Bessemer converters at the plant of the Lackawanna Steel Co., Buffalo. These pictures were prepared by Rogers, Brown & Co., Buffalo, and their exhibition was accompanied by explanatory remarks by H. B. B. Yergason, of that firm.

Prefatory to the exhibition of the films, W. A. Rogers, of Rogers, Brown & Co., explained that his company had accepted with some hesitancy the gracious invitation of the Institute to show the pictures. He stated that as the series had been prepared as an advertisement, his firm had reluctantly given its consent to the exhibition, only after receiving assurances from the officials of the Institute, that the pictures were of such value that no question of good taste or propriety, could arise. This explanation, Mr. Rogers believed, was due the members of the Institute.

Plants Visited

Saturday was devoted by the members of the Institute to sight-seeing trips through the great steel plants in and around Pittsburgh, particularly those of the Jones & Laughlin Steel Co., Pittsburgh; Carnegie Steel Co., at Homestead, and the National Tube Co., at McKeesport. Invitations were also extended the members to visit the School of Mines of the University of Pittsburgh, and the buildings of the Carnegie Institute of Technology, Pittsburgh.

A suggestion from the editor of the *Manufacturers' Record* that the Institute hold its next meeting away from New York, at Birmingham, Ala., was read by Judge Gary. As no suggestions were made by the members, the invitation was referred to the attention of the directors of the Institute.

Those in Attendance

The guests seated at the banquet were the following:

Franklin E. Abbott, W. E. Acomb, Taylor Alderdice, J. I. Andrews, M. Cochran Armour, Harry L. Austin.

Frank Baackes, R. W. Bailey, William M. Bailey, Alexander F. Banks, Duke N. Banks, Henry A. Barren, Jacob C. Barrett, George Bartol, Ephraim Bayard, Addison H. Beale, Horace A. Beale Jr., Thomas A. Beattie, George H. Beaumont, Charles W. Bennett, Quincy Bent, Louis C. Bihler, E. L. Billingslea, W. W. Blackburn, Ernst Boley, Charles H. Booth, Henry P. Bope, Adolph E. Borie, L. H. Bowman, H. S. Braman, Thomas J. Bray, Robt. E. Brooke, Edwin C. Brown, Fayette Brown Jr., John Brunner, Daniel M. Buck, Eugene J. Buffington, Joel W. Burdick, Levi H. Burnett, Henry A. Butler, Joseph G. Butler Jr.

James M. Camp, Louis J. Campbell, James A. Campbell, James J. Campbell, Augustus W. Carey, Perry E. Carhart, Robert B. Carnahan Jr., Clyde Mitchell Carr, Walter C. Carroll, John B. Carse, John C. Chandler, S. H. Chauvenet, Eugene B. Clark, Edmund

A. S. Clarke, Daniel M. Clemson, Walter H. Clingerman, C. L. Close, Charles C. Cluff, William G. Clyde, D. H. Coble, L. E. Cochran, Stewart C. Coey, John P. Collins, Edgar S. Cook, Edward B. Cook, Howard D. Cook, Charles L. Cordes, William A. Cornelius, Frederick Crabtree, Theron I. Crane, W. D. Crawford, Allerton S. Cushman.

Charles I. Dailey, Thomas Darlington, James R. Darragh, Henry J. Davis, Stewart A. Davis, Montrose S. Dennis, Bradley Dewey, Ambrose N. Diehl, James W. Dietrick, Fred D. Dimmick, Alva C. Dinkey, Ambrose N. Dinkey, Charles E. Dinkey, W. H. Donner, John W. Dougherty, M. J. Dowling, Geo. F. Downs, Daniel J. Driscoll, Herbert DuPuy.

George P. Early, William H. Eaton, Richard H. Edmonds, C. H. Elliott, Mason Evans.

Charles T. Fairbanks, J. M. Faris, James A. Farrell, Charles Fell, E. C. Felton, A. I. Findley, William U. Follansbee, James H. Foster, Arthur A. Fowler, Lewis W. Francis, J. F. Froggett, Fred M. Fuller.

Elbert H. Gary, James Gayley, Frederick C. Gedge, H. R. Gilbert, Walter H. Glasgow, Alexander Glass, John W. Gocher, Peter J. Gordon, Eugene G. Grace, Augustus B. Grange, Leslie J. Gray, James H. Grose, F. Justice Grugan.

Storm B. Haarbye, Edward J. Hagar, John L. Haines, Francis J. Hall, Edward J. Hamilton, John W. H. Hamilton, Nils V. Hansell, Charles Hart, Joshua A. Hatfield, Will L. Hayes, Benjamin P. Hazeltine, Henry W. Heedy, F. A. Heitmann, Axel H. Helander, Harry E. Higgins, J. H. Hillman Jr., John A. Hock, Alexander L. Hoerr, William S. Horner, Herbert P. Howell, Elton Hoyt, 2nd, John W. Hubbard, F. B. Hufnagel, I. Lamont Hughes, Azor R. Hunt, John A. Hunter, A. F. Huston, A. H. Hutchinson, O. N. Hutchinson.

William A. Irvin.

Ward W. Jacobs, W. A. James, Alexander Jarecki, Joseph W. Jeffrey, George S. Jenks, George W. Jewett, Joseph E. Johnson Jr., Charles T. Johnston, Leslie M. Johnston, Harry R. Jones, Richard Jones Jr., William L. Jones.

J. S. Keefe, Hugh Kennedy, Julian Kennedy, Thomas W. Kennedy, William W. Kennedy, Severn P. Ker, R. B. Kernahan, John P. Kessler Jr., G. Cook Kimball, Austin King, Willis L. King, Robt. C. Kirk, Luther L. Knox, E. C. Kreutzberg.

Robert P. Lamont, Edward Langenbach, Alexander Laughlin, George M. Laughlin Jr., John F. Lewis, William H. Lewis, James Lippencott, John T. Llewellyn, Silas J. Llewellyn, F. Lorenz, Wilson A. Luce, Charles W. Lutz, Harry E. Lynch, Thomas Lynch.

William C. McCausland, Elmer T. McCleary, James T. McCleary, Samuel McClure, Wm. McConway, Archibald McCrea, John A. McCulloch, Charles H. McCullough Jr., Thomas McDonald, Charles B. McElhany, E. S. McElroy, William A. McGonagle, John W. McGrady, John McLeod, George F. McKay, Charles E. McKillips, Charles McKnight, Andrew E. Maccoun, Anson Mark, Charles D. Marshall, Clinton S. Marshall, Simon S. Martin, Amasa S. Mather, Samuel L. Mather, William G. Mather, John A. Mathews, Daniel B. Meacham, David L. Mekeel, Robert J. Mercur, Eugene L. Messler, George Mesta, Charles L. Miller, John P. K. Miller, George E. Molleson, Leigh B. Morris, W. T. Mossman, Oliver M. Mowat, Edmund W. Mudge, James G. Mustin.

Albert L. Nash, John C. Neale, Robert W. Ney, Charles F. Niemann, Francis E. Norris, Frank R. Nullmeyer.

O. Offut, John W. Offut, H. Oeking, Paul Oeking, Edwin N. Ohl, John O'Keefe, Rudolph Ortmann, Edward O'Toole.

William P. Palmer, Eugene W. Parguy, C. P. Parker, Robert L. Parrish, Peter C. Patterson, Albert Patton, Leonard Peckitt, John A. Penton, Ward B. Perley, John O. Pew, James S. Phifer, William S. Pilling, Andrew Pinkerton, Arthur E. Piper, Charles E. Pope, Veryl Preston, Oscar L. Pringle.

Henry A. Raymond, James H. Reed, William C. Reilly, David Reeves, John Reis, J. Leonard Replogle, John V. W. Reynders, Frank C. Roberts, Alexander P. Robinson, Chas. R. Robinson, C. Snelling Robinson, Theodore W. Robinson, S. M. Rodgers, Wm. A. Rogers, Max Rozankranz, Wallace H. Rowe, Harry L. Rownd, Wm. Fitzhugh Rust, C. F. W. Rys.

Morrison Sander, William D. Sargent, W. F. Schlieter, William B. Schiller, Isaac M. Scott, James Scott, James H. Sheadle, Samuel B. Sheldon, Wm. O'Neil Sherman, McGillvray Shiras, B. R. Shover, Jesse J. Shuman, John M. Sias, James Sim, Robt. Skemp, Joseph R. Skewis Jr., Edwin E. Slick, George Smart, Cameron C. Smith, James W. Smith, S. B. Smith, Geo. T. Snyder, W. P. Snyder Jr., Harrison Souder, Joseph T. Speer, F. N. Speller, John Stambaugh, W. A. Stanton, Rollin S. Steese, Archibald A. Stevenson, Malcom R. Stevenson, Walter C. Stone, Bradley Stoughton, William J. Sullivan.

Benjamin Talbot, Benjamin H. Taylor, John M. Taylor, Knox Taylor, Wade A. Taylor, Eugene P. Thomas, George Thomas, Leon E. Thomas, W. A. Thomas, T. Frame Thomson, Alexis W. Thompson, David Tod, Enrique Touceda.

Lawrence H. Underwood, Edward H. Utley.

William R. Walter, George B. Waterhouse, Ralph H. Watson, Samuel T. Wellman, Harry D. Westfall, John Wheeldon, Harlow B. Wheeler, William Whigham, Samuel H. Whitaker, G. Arthur White, H. S. White, George S. Whyte, C. F. Williams, Homer D. Williams, Idris R. Williams, Frank A. Wilmot, James W. Wilson, Geo. E. Wisener, Hartley Wolle, F. W. Wood, Richard G. Wood, Walter Wood, Leonard G. Woods, Edward Worcester, E. H. Worth, W. P. Worth.

H. B. B. Yergason, Andrew G. Young.

E. M. Zehnder.

LAYS CORNERSTONE

Of New Union Central Building, Cincinnati, on Oct. 23.

The corner stone of the new Union Central building, Cincinnati, was laid on Oct. 23, by Jesse R. Clark, president of the Union Central Life Insurance Co., for which concern it is being erected. Addresses were made by Elbert P. Marshall, Dr. Clark W. Davis, Allan Waters and Jesse Clark, all officials of the above named company; Walter Draper, president of the Cincinnati Chamber of Commerce; Henry Keep, superintendent of the Thompson-Starrett Co., and F. W. Garber, one of the architects who designed the building. The structure will be 34 stories in height, and will be the tallest office building in the world outside of New York City. About 9,000 tons of steel will be used in its construction, and it will be finished in April, 1913. The Thompson-Starrett Co., Philadelphia, is the general contractor.

RESUME ACTIVITY

Hartford and Cambria Opened After Two Years of Idleness.

Marquette, Mich., Oct. 29.—On the Marquette range, the Republic Iron & Steel Co.'s Hartford and Cambria properties at Negaunee, Mich., inactive for nearly two years, have resumed mining operations. Preparations had been going on for the last two months and the mines are now ready for the employment of at least 200 men.

The work of the last few weeks has put the properties in excellent condition, and it is expected a considerable tonnage of ore will be shipped from the pockets before the close of navigation. As there are few, if any, miners out of work on the range at this time, it is expected it will take several weeks before the forces can be recruited to the numbers desired.

With these mines in commission there will be practically as many men on the mining payrolls at Negaunee as during the boom period of 1907. The Cleveland-Cliffs Iron Co.'s Negaunee and Maas properties have made heavy increases in their working forces the last two months, and both the Breitung company and the Jones & Laughlin Steel Co. are operating briskly. There will be plenty of work at Negaunee this winter for all the men the iron companies are able to procure. The operators are preparing for a big season next year, as is the case in many other districts of the Lake Superior region.

An ore concentrating plant, the first installed on the Marquette range with the exception of an ill-starred plant erected at Negaunee many years ago, has gone into commission at M. A. Hanna & Co.'s American mine at Diorite. It has been erected to treat the low grade ore found in the underground workings, in conjunction with the higher grade material, and the mining of which entails very little added expense. The plant is expected to yield considerable returns. The ore, which first is crushed, is subjected to jigging and then to the slime table process.

At Negaunee, the Cleveland-Cliffs Iron Co. has suspended operations at its South Jackson ore crushing plant for the season. Some 50,000 tons were shipped from the crusher during the five months' run.

The Hattie Ensley furnace, of the Sloss Sheffield Steel & Iron Co. at Sheffield, Ala., has been blown in, the fires being lighted for the first time since July 28, 1911. Approximately $100,000 has been spend in repairs since the furnace was blown out.

Secretary Nagel Urges National Tribune Formation

To Pass Upon Charters of Corporations—Addresses National Implement and Vehicle Association in Convention at Cleveland

With an address by Secretary Charles Nagel, of the department of commerce and labor, in which he set forth the relations between his department and the manufacturers, the National Implement and Vehicle Association concluded its nineteenth annual convention in Cleveland, Oct. 25. The meeting was easily the greatest in point of attendance and interest, ever held by the organization.

Mr. Nagel urged the formation of a national tribunal to pass upon charters of corporations. He also advocated the organization of departments of commerce and industry in city, state and nation.

The adoption of such a radical measure as the minimum wage law, he stated, should be deferred until it was determined that such action would not mean maximum wages as well. Compulsory insurance measures could not be adopted, nor could any man accept protection of any kind, without giving up his individuality, the secretary held.

Taking up the question of regulation of railroad rates, Mr. Nagel stated it brought up the unsolved question as to what extent such regulation discouraged the enterprise and boldness which result in men risking what they possess in railroad development.

In a fuller exposition of his idea of a national tribunal, he held that federal charters should be granted by an administrative department instead of the judicial, adding that at present there is no method of saying how a corporation could be reorganized after such a step had been ordered by the courts. Such a body, he stated, should be established where plans of new and old corporations could be submitted for governmental approval.

William Butterworth, of Deere & Co., Moline, Ill., was chosen president of the association for the following year. Other officers elected were: Treasurer, H. N. Wade, of the United States Wind Engine & Pump Co., Batavia, Ill.; chairman of the executive committee, J. A. Craig, Janesville Machine Co., Janesville, Wis. The members of the executive committee chosen for three-year terms were G. A. Ranney, International Harvester Co., Chicago; H. M. Wallis, J. I. Case Threshing Machine Co., Racine, Wis.; F. L. Mitchell, Mitchell-Lewis Motor Co., Racine, Wis. E. Herschel, of the R. Herschel Mfg. Co., Peoria, Ill., was chosen as member of the executive committee for two years to succeed U. G. Orendorf, and Dr. E. A. Rumely, of the M. Rumely Co., Laporte, Ind., as member for one year.

The vice presidents elected were Edward C. Douglas, W. & B. Douglas, Middletown, Conn.; J. B. Bartholomew, Avery Co., Peoria, Ill.; F. B. Park, Flint & Walling Mfg. Co., Kendallville, Ind.; C. N. Hart, Hart-Parr Co., Charles City, Ia.; J. M. Preston, Severance Tank & Silo Co., Lansing, Mich.; J. H. Anderson, Anderson Co., St. Paul, Minn.; C. B. Dempster, Dempster Mill Mfg. Co., Beatrice, Neb.; Fred Bateman, Bateman Mfg. Co., Grenloch, N. J.; A. J. Arend, DeLaval Separator Co., New York City; A. B. McLean, Roderick Lean Mfg. Co., Mansfield, O.; R. S. Buch, A Buch's Sons Co., Elizabethtown, Pa.; George R. James, James & Graham Wagon Co., Memphis, Tenn.

The 1913 convention will be held in Peoria, Ill.

Among the resolutions adopted at the meeting was one calling upon each member to communicate with members of the senate and the house of representatives in an effort to secure a resumption of treaty relations with Russia. The association vigorously condemned the action of congress in abrogating the treaty of 1832 with Russia and pointed out the detriment inflicted upon the manufacturing interests of the country if prohibitive duties upon American goods were imposed by the czar's government.

The resolution calls upon commercial bodies throughout the country to assist in securing satisfactory relations with Russia. The export trade with that country had reached, under the treaty of 1832, many millions of dollars annually and the loss of this business, it was pointed out, would inevitably result disastrously for this country.

The convention, which met on Wednesday of last week, when reports were made showing the strong position of the association, was addressed by three speakers at the meetings on Thursday. Franklin H. Wentworth, secretary of the National Fire Protection Association, spoke on "Fire Protection"; Dr. E. A. Rumely, Laporte, Ind., general manager of the Rumely Mfg. Co., spoke on "The American Manufacturer and Industrial Education"; and Robert J. Young, of the Illinois Steel Co., Chicago, lectured on "Safety", which lecture has previously appeared in THE IRON TRADE REVIEW.

Dr. Rumely, after pointing out the dearth of skilled labor in this country, which has shown in a negative way the need of vocational training, declared that an extension of our school system to include training for industrial efficiency, was necessary.

The social features of the convention were varied and elicited considerable praise from the visiting members, as the Cleveland committee in charge had provided a schedule of entertainments of unusual interest. There were receptions, theater parties, automobile rides around the city and a ball on Thursday night.

The annual banquet on Friday was easily the most sumptuous in its appointments, of any ever given by the association. It was held in the newly opened Hotel Statler, and as a surprise, guests were entertained with a band, stringed orchestra and singers.

S. D. Latty, of the Kirk-Latty Mfg. Co., Cleveland, was general chairman of the Cleveland convention committees and J. F. Donahue, of Russell, Burdsall & Ward Bolt & Nut Co., Chicago, was chairman of the auxiliary entertainment committee.

Members of the finance committee were: Chairman, W. A. Comstock, Cleveland Wire Spring Co.; S. L. Smith, National Malleable Castings Co.; W. P. Champney, the Eberhard Mfg. Co.; E. M. Williams, Sherwin-Williams Co.; C. E. Adams, Cleveland Hardware Co.; H. B. Hare, Otis Steel Co.; F. B. Richards, M. A. Hanna & Co.; J. R. Blakeslee, Ajax Mfg. Co.; R. C. Moody, the Cleveland Wire Spring Co.; W. J. Glidden, Glidden Varnish Co.; G. F. Rummel, American Steel & Wire Co., Chicago; C. W. Scofield, Lake Erie Iron Co.; J. E. Williams, National Screw & Tack Co.; J. R. Scott, Carnegie Steel Co.; R. S. Hall, Bourne-Fuller Co.; J. C. Chandler, Lackawanna Steel

Co.; E. D. Rogers, Cambria Steel Co.; F. G. Smith, Osborn Mfg. Co.

Members of the theater committee were: Chairman, F. W. Davis, Lake Erie Iron Co.; D. S. Guthrie, Republic Iron & Steel Co.; Myles E. Ewing, Kirk-Latty Mfg. Co.; Ben Patterson, Patterson-Sargent Co.; H. C. Holt, Lamson & Sessions Co.

Members of the ball committee were: Chairman, R. P. Zint, Republic Iron & Steel Co., Chicago; L. B. Quinn, Sherwin-Williams Co., Chicago; N. J. Clarke, Upson Nut Co.

Members of the banquet committee were: Chairman, Ricord Gradwell, Oliver Typewriter Co., Chicago; E. J. Baker (*Farm Implement News*), Chicago; R. M. Kilgore, Jones & Laughlin Steel Co.; J. W. Porter, Calumet Steel Co., Chicago.

Members of the ladies' entertainment committee were: Chairman, J. R. Scott, Carnegie Steel Co.; George T. Bailey, Oliver Iron & Steel Co., Pittsburgh; C. W. Hertel (*Implement Trade Journal*), Kansas City; W. G. Clyde, Carnegie Steel Co., Pittsburgh; J. M. Pickands, Pickands, Mather & Co.

A number of interesting exhibits were shown at the convention and daily attracted a large number of visitors.

ORE DRYING PLANT

To be Installed at Brunt Mines of M. A. Hanna & Co.

M. A. Hanna & Co. have closed a contract with the Ruggles-Coles Engineering Co., 50 church street, New York, for the installation at their Brunt mines, near Virginia, Minn., of a mechanical ore-drying plant. This plant will consist of two of the Ruggles-Coles class A dryers, 90 inches in diameter by 55 feet length. Each will have a capacity for drying 23 tons of ore an hour, reducing the moisture from 18 to 6 per cent. It is expected that the plant will be operating about the middle of February.

The results of the use of these machines promise to be watched with much interest by the operators of the Lake Superior ranges, where the drying of ore at the mines has not as yet been adopted on any considerable scale. The economies sought to be obtained by the drying of the natural ore at the mines include the enrichment of the ore per ton, the saving of freight per unit of iron, the avoidance of the danger of furnace explosions from high moisture ore and of the difficulties of handling frozen ore.

AXE PLANT SOLD

And Will Resume Operations—Merger at Beaver Falls.

Beaver Falls, Pa., Oct. 28.—The axe plant at Beaver Falls, formerly operated by the American Axe & Tool Works, has been purchased by John Mack, who intends to begin manufacturing operations shortly after the first of the year. This plant was shut down last July, a small portion of the equipment being moved to the Glassport, Pa., plant of the American Axe & Tool Works. This equipment Mr. Mack will replace as speedily as possible. Mr. Mack's experience in manufacturing axes dates back to 1880, when he first learned the trade at the plant of the Jamestown Axe & Tool Co., Jamestown, N. Y. When the American Axe & Tool Works was organized in 1899, Mr. Mack was made manager of the plant at Jamestown, where he remained until 1899, when he was appointed manager of the Beaver Falls plant. This position he still held when the plant was abandoned last July. Mr. Mack expects to produce from 90,000 to 100,000 dozen axes per year after he gets the plant in operation.

Messrs. Ingram and Richardson, proprietors of the Ingram-Richardson Mfg. Co., Beaver Falls, have decided to disband the Porceliron Co., of which they are also proprietors, and merge the two companies under the name of the Ingram-Richardson Mfg. Co. The Porceliron Co. was organized a year or two ago for the purpose of manufacturing enameled sheet steel ranges, kitchen tables, etc. The Ingram-Richardson Mfg. Co. is beginning work on a new two-story building, 30 x 300 feet, from which shipments will be made. The upper story will be used for warehouse purposes, while the first story will be used for assembling Porceliron gas heaters, and kitchen tables. It will be equipped with drill presses and grinding, polishing and buffing machinery. These tools, including an elevator, have not yet been purchased. The company is also erecting an addition to its enameling shed and putting in some new enameling furnaces. The company plans to make some further improvements in the near future.

The Union Drawn Steel Co., Beaver Falls, has created a new office, that of general manager of sales. Thomas Towne, formerly eastern manager of sales, with headquarters in New York, will assume the new position on Nov. 1. The Union company, which erected a new power plant two years ago, has commenced work on the construction of a second plant which will be an exact duplicate of the one now in operation. The new unit, consisting of an engine and a generator, will be housed in a new building which is now in the course of erection. The building and machinery together will cost $25,000. This will give the company an available capacity of 2,000 horsepower. The company is also constructing a 250-kilowatt hydroelectric power plant to be used for auxiliary purposes. A new brick building is being erected for the latter plant.

John Lithgo, formerly superintendent of the Knott & Harker Co., founder and machinist, Beaver Falls, resigned on Oct. 1, to accept a similar position with the Watt Mining Car Co., Barnesville, O. His successor is John W. Grimes.

The Keystone Driller Co., Beaver Falls, is just commencing work on a new one-story brick building, 60 x 360 feet, to be used as a forge shop and machine shop. Into this will be moved some of the equipment from the present machine and forge shop, and a boiler shop will be installed in the building thus vacated. The company will also erect a two-story addition, 20 x 110 feet, to its foundry. This will be used as a pattern storage. F. M. Hopkins, who has been superintendent of the Keystone Driller plant for many years, has just returned from Mount Clemens, Mich., where he went to recuperate after a long illness.

The Howard Stove Co., Beaver Falls, has shut down its steam power plant, and is now operating its plant by electric motors, purchasing the current from a local power company.

The Standard Gauge Steel Co., Beaver Falls, is adding some new drop forging machinery to its equipment. It is also installing some new power plant equipment.

Monthly Report Shows Gain

The net earnings of the Alabama Consolidated Coal & Iron Co., Birmingham, Ala., were $21,325.79, for the month of September. This was shown in a report made to Judge E. H. Dryer, referee in bankruptcy, by Harry W. Coffin and W. E. Leake, receivers. The company and receivers naturally feel very optimistic over the report. Joshua Levering and other members of the reorganization committee have been in conference in Birmingham with Messrs. Coffin and Leake. While they have no definite

BRITISH AND CONTINENTAL MARKETS

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Oct. 19.

Pig Iron.—But for the trouble in the Balkans the state of the pig iron market would be wholly satisfactory from the seller's point of view. The political disturbances were accountable for some reductions in price early in the week. But a certain amount of recovery has already taken place and some credit for this must be given to the very encouraging reports from America which have helped to counteract the malign influence of war in eastern Europe. Yesterday's prices at Cleveland were 66s 11d ($16.38) for warrants, with 67s 4d ($16.48) one month, and 68s ($16.64) three months. A substantial amount of business is going through. The operations of speculators are accountable for the fact that present prices are only on the basis of five weeks ago. In the present state of scarcity, prices should be rapidly rising. In Sheffield, the scarcity of material is becoming serious. A great many works have been obliged to stop for short periods, for want of pig iron. Makers of Siemens steel cannot obtain sufficient pig iron to keep their furnaces running, and this is reducing the supply of billets, used for so many requirements at local works. Naturally, all the quotations for pig iron, outside the speculative circle of Middlesbrough, are very firm. Another effect of the scarcity is that forge iron is becoming scarce. Many pig iron consumers have deliberately kept down their purchases, because of the high prices and this has emphasized the trouble. They are now mainly concerned with getting supplies. Wherever possible, makers are utilizing scrap, of which there is a plentiful supply, and this is relieving the pressure a little, while adding materially to scrap prices. The shortness of material is increased, owing to congestion on the railways, transport difficulties being very much in evidence. Rolling stock is very short, and a good deal more will be heard of railway breakdowns, as the winter approaches. A more serious matter is the scarcity of coke. Some smelters have been having most unfortunate experiences, and furnaces here and there have been put on slack blast for need of fuel, in some cases with serious results to the furnaces themselves. There is no doubt that the effect of the coal strike in the spring is still being rather severely felt. The demand for hematite keeps up very well. The Barrow district was never so full of orders, and good sales are being made on home, foreign, colonial and continental account. In the northeast district, the trade is in a very strong position. Makers have no stocks, every ton produced is immediately absorbed, and it is impossible to meet the pressing demands for deliveries. As there are no stocks of hematite, makers can command their own prices. East coast mixed numbers are quoted at 80s ($19.58) with a few second-hands 6d to a shilling below this figure. The October shipments have been excellent, the withdrawals from store this month totalled 15,000 tons, and the shipments have exceeded 50,000 tons, far and away beyond anything for a similar period this year. They would have been still heavier, but for a good deal of congestion on the River Tees, which is badly in need of further wharf accommodation.

Finished Iron and Steel. — New orders have not been quite so plentiful this week, the slight slackness being partly attributable to the trouble in the Balkans. But everybody has plenty to do, and makers are inclined to welcome a little relief of the pressure. In the Birmingham district, bar makers are very busy, at recent prices. It seems likely that marked bars will be unchanged in price. Unmarked bars are rather firmer, but the cheaper irons are being increasingly made locally, for nut and bolt purposes, lock making, etc. The local makers claim that a good deal less of this iron is coming in than formerly, from the continent. At the meeting on Thursday, slit nail rods were advanced from £8 15s to £9 5s. A large trade is being done in tube and bedstead strip. Wire has been advanced, as the result of a conference with makers held at Manchester at the beginning of the week. The galvanized sheet trade has quite overcome its recent weakness, and is going forward, owing to large orders.

GERMAN IRON TRADE

Berlin, Oct. 19.

The market for all materials, raw and finished, is firm. Practically all iron works are full of orders, so that the suspension of new buying is at the moment a relief rather than a misfortune. It is stated that iron and steel masters are much more deeply sold than in the boom at the turn of the century, although prices are still considerably lower. Specifications of many works will keep them busy until well into next year. The Ship-Steel Syndicate is sold up with specifications in hand until the end of next June. Ores are strong, stocks are worked off, and the output is being carried off as soon as ready. Pig iron rules firm at the recent advance of 3 to 5 marks (70½ cents-119½ cents) per ton of 2,240 pounds, and a further rise is conditional on the importance of the rise in coke. Scrap is quiet owing to its plentiful supply. Half-products are scarce and under pressure, with a good export demand. The Steel Syndicate shipped from works during September 152,400 tons, against 163,900 in the previous month and 153,900 in September last year. Bar mills are extraordinarily busy and mostly sold up to July, with specifications in hand to February. Hoop iron is good, and the syndicate has just raised prices 2 marks (47c) for the home market, and 2½ marks (58¾c) for export. Pipe is doing well with prices 10 to 15 marks ($2.35 to $3.52½) higher since the principal mills have come to an agreement. Structural shapes are seasonably quieter, but mills still busy. Last month's shipments by the Steel Syndicate were 178,500 tons against 195,800 in the previous month and 175,200 in September, 1911. There is a good export demand at 115 marks ($27.02½), f. o. b. Antwerp. Plates very active, despite a largely increased output; quotations for the home market are 130 to 133 marks $30.55 to $31.25½), for export 136-138 marks ($31.96 to $32.43), f. o. b. Antwerp. Sheets are busy and specifications liberal. Rolled wire mills are working under pressure. Negotiations for a renewal of the Wire Syndicate are proceeding.

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, the volume of machinery orders placed during the past week, approximated the best weekly total of the year. New inquiries have also come out freely, adding a large aggregate of prospective business to the satisfactory total previously before the trade. The Norfolk & Western railroad has distributed a list of 30 machine tools, aggregating in value between $40,000 and $50,000. This list originally was put out in the Philadelphia market, but was distributed only recently among New York sellers. The Morrow Mfg. Co., Elmira, N. Y., has announced that during 1913, more than $100,000 worth of new equipment will be added to its plant in that city The Pennsylvania General Electric Co. is planning to add another building to its plant at Erie, Pa., which will require considerable machine tool equipment. The Virginian and Lake Shore railroads are also said to be preparing extensive lists of shop equipment. The most conspicuous buyers in the New York market during the week, were the General Electric Co. and the New York, New Haven & Hartford railroad. These companies did further closing on specifications put out some weeks ago and the New Haven company bought a few machines not included in its list.

In Cleveland, the market last week reacted from the dullness in evidence during the preceding week and orders for a considerable volume of machinery were closed. One dealer secured a good sized order for shop equipment on an inquiry put out some time ago, but with that exception, the business was done in small lots, with all grades strong. Second hand machinery is going fairly well. Dealers are expecting awards to be made soon on the inquiry put out by the Upson Nut Co., some time ago.

In Cincinnati, most of the orders for machine tools at present call for foreign shipment. Domestic business has fallen off a little, but the increased activity among the foreign buyers about counterbalances the market. There are rumors that the Big Four and the Erie railroads are about to send out inquiries for good sized lists of machine tools, but these may be withheld until the first of the year. Business done during the month of October may equal that of September, but it is quite probable that it will not be any better. From all appearances July and August, generally speaking, will be the banner months of the year. Lathes remain in as good demand as any of the machine tools, and milling machines have been selling a little better. Electrical machinery manufacturers report a good business, as has been the case for some time. There is a scarcity of laborers in both the foundries and machine shops, which is handicapping some of the larger companies.

New Construction

The Otis Fensom Elevator Co. is building a new factory at Hamilton, Ont.

The Peerless Tube Co., Bloomfield, N. J., has let a contract for extending its plant.

The American Rotary Valve Co., Anderson, Ind., has begun work on the construction of a brass and iron foundry.

The Canadian Car & Foundry Co. has awarded the contract for its new boiler shop at Amherst, N. S., to the Rhodes Curry Co.

A $10,000 factory is being built at St. Thomas, Ont., for A. J. Stough, manufacturer of steel grave vaults. Steel riveting machines and blacksmith equipment will be required.

The Canada Iron Corporation is planning an addition to its plant at Stratford, Ont., which will increase its output from 150 to 225 car wheels per day.

The contract for a steel works building has been awarded to the Variety Iron & Steel Co., Cleveland, by the Upson Nut Co., that city. A one-story corrugated steel building is planned, about 85 x 110 feet, with maple and cement floors, electric lights, steam heat and a composition roof.

The Air Turbine Co., Harrison, N. J., recently acquired a site on Hunterdon street, near Third avenue, that city, on which it will shortly erect a new manufacturing plant.

The recently incorporated F. H. Pownall Iron Works, Jamesburg, N. J., is said to be perfecting plans for the construction of an iron, brass and copper foundry.

The American Can Co., Fourteenth street and Tenth avenue, New York, has let the contract for an extension to its New Orleans factory, to cost $40,000.

Bernstein Bros., leather manufacturers, Frelinghuysen avenue, Newark, N. J., have filed plans for a two-story factory, 60 x 80 feet, estimated to cost $30,000.

The Keystone Driller Co., Beaver Falls, Pa., is considering the erection of a new forge shop and another building. The latter will probably be used as an assembling department.

The board of trade of Chester, Pa., has closed an arrangement with the Dawson Mfg. Co., of Syracuse, N. Y., whereby a plant will be built at the former city for the manufacture of rolling grates.

The W. C. Welch Co., Woburn, Mass., is to erect six new buildings on recently-purchased land off Salem street, near the Newburyport branch of the Boston & Maine railroad. The main japanning plant will be 38 x 108 feet, two stories, with an ell 76 feet.

Louis Berges & Co., Cypress and Maple avenues, Brooklyn, N. Y., have completed plans for a factory building, 75 x 95 feet, and two stories high, for Walbroehl & Co., manufacturers of gas fixtures, 350 Knickerbocker avenue.

Edward Schmidt & Co., 31 Union Square, New York, have filed plans for a small factory building to be erected on 221st street, near Barnes avenue, that city. The plans call for a one-story brick building, 50 x 110 feet, to cost $10,000. Evarts Tracy, 244 Fifth avenue, is the architect.

The American Locomotive Co., 30 Church street, New York, is taking bids on the construction of a one-story addition to its Long Island City plant. Milliken & Moeller, 103 Park

avenue, New York, prepared the plans which will involve the expenditure of about $40,000.

The Standard Underground Co., 50 Church street, New York, has had plans prepared for a factory to be constructed at Perth Amboy, N. J. The building will be 137 x 61 feet, and three stories high. G. W. Brooks and J. K. Jensen, 196 Smith street, Perth Amboy, are the supervising architects.

The Rockford Malleable Iron Works, Rockford, Ill., is erecting several buildings containing more rooms for its molding, coremaking and annealing departments. Superintendent Rutz says that the work is held back by lack of men, and that when the new buildings are completed still more men will be needed. Men of all trades connected with the foundry business are wanted.

The Canadian Malleable Iron Co. has secured a site of 30 acres formerly occupied by the mills of the Carney Lumber Co., at Owen Sound, Ont., which were destroyed by fire last spring. The company will build a plant, a contract for the first building, 80 x 500 feet, having been let. Others will follow as the expansion of the business may require. The town pays $4,000 towards the cost of the site and gives the company a loan of $60,000 for four years.

The Osgood Bradley Car Co., Worcester, Mass., which heretofore has confined its efforts to the manufacture of wooden railroad coaches, and street cars, is to engage in the manufacture of steel cars. It will erect a large addition to its plant in Greendale, Mass., and install machinery for the new line of work. The McClintic-Marshall Construction Co. has been awarded the contract for the erection of the new building, which will be of steel and reinforced concrete construction, 150 x 280 feet, and 40 feet high. It will require 300 tons of steel and will cost between $35,000 and $40,000.

The William Graver Tank Works, East Chicago, Ind., has just let a contract for a new building 66 x 100 feet, all steel construction. The Wisconsin Bridge & Iron Co. secured the contract. This building will be used as a fabricating shop and will be equipped with rolls, punching tables, punches, shears and a 10-ton 30-foot crane. None of this equipment has been ordered. Another building 30 x 30 ft. will also be erected and used for the storage of road equipment. This will probably be of light steel construction. It is expected that these new additions to the plant will be completed in about 60 days.

The National Cast Iron Pipe Co., recently incorporated in Alabama, is planning to erect a modern pipe plant on a tract of 50 acres northeast of Boyles, Ala. The new plant, it is stated, will manufacture only gas mains and water mains, from four to 30 inches in diameter. An output of 150 tons of finished product per day is expected. The plant will employ between 400 and 500 men. The officers and directors of the new company are as follows: President, A. H. Ford; vice president and general manager, E. H. Linthicum; secretary and treasurer, A. E. Nelson; A. H. Ford, E. E. Linthicum, A. E. Nelson, George B. Tarrant, F. M. Jackson and O. W. McMillan, directors.

The Standard Steel Construction Co., Ltd., Welland, Can., advises that it has purchased 30 acres of land near Welland, on which it will eventually build extensive shops for the fabrication of steel construction. At present a temporary building is being put up to be used for building the permanent plant. It will also take care of outside orders to the extent of about 500 tons a month until the company is ready to build the larger works. Niagara power will be used. The plans for the present shop have been completed and a part of the machinery requirements have been bought. Purchases are being made in Canada whenever possible. Both Americans and Canadians are included in the list of stockholders of the company. Orders are being taken for February delivery.

The Lynchburg Foundry Co., Lynchburg, Va., advises that it is letting the contracts for its proposed Anniston, Ala., pipe plant. This building will be of steel construction, 115 x 210 feet. It will be in the market for a cupola blower, two cupolas, some electric motors and a hydraulic pump. The company is contemplating erecting several other buildings for storage purposes. No special foundry machine shop or pattern shop will be erected, as all equipment will be made and machined at the Lynchburg and Radford, Va., plants and shipped to Anniston, ready for use. A power plant will not be built, as the company expects to get power from an electric company, and all machines will be direct motor driven. An output per diem of about 100 tons of bell and spigot water and gas pipe is expected.

Power Plant Equipment

L. B. Herrington, president of the Dix River Power Co., Richmond, Ky., is preparing to receive bids on the construction of the hydro-electric plant to be built on Dix river near Richmond.

The state board of public utility commissioners has granted permission to the Public Service Gas Co., Newark, N. J., to issue $1,300,000 in bonds, the proceeds of which are to be used for improving and enlarging its existing gas plants.

Henderson, Ky., is considering recommendations of Leslie Hite, superintendent of the electric light plant, to the effect that a boiler and turbine should be installed as relief reserve units, the plant at present being badly overloaded. Action on the purchase of the equipment will be taken shortly.

Water Works

Berea, Ky., will vote on a bond issue of $16,000, Nov. 5, the proceeds of the issue to be used in the construction of a water plant.

New Buyers

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

Swan Machinery Co., Joplin, Mo.; $75,000; by W. A. Swan, C. G. Boyer, A. T. Swan and Lee Swan.

Galion Brass & Bronze Co., Galion, O.; $75,000; by C. J. Rath, B. L. Sites, J. G. Brown, C. C. Coyle and C. J. Gugler.

Joseph L. Skeldon Engineering Co., Toledo, O.; $10,000; by Joseph L. Skeldon, David F. Skeldon, M. C. Griffin, Alma Haynes, Claud Rodgers.

Durham Duplex Razor Co., Ltd., Toronto; $40,000; provisional directors, Wm. E. Albus, Geo. P. McHugh and Wm. H. Furlong.

F. Bierman & Sons Metal & Rubber Co., St. Louis; $16,000; to buy and sell metal and rubber; by Fred, Samuel L. and Isaac Bierman.

Sparta Plow Works, F. R. Crothers & Co., proprietors, Sparta, Ill.; $30,000; by William H. Pinkerton, Anna S. Crothers and Frank E. Pinkerton.

National Wire & Fibre Products Corporation, Plainfield, N. J.; $1,000,000; wire fibre, rope, cloth belting, etc.; by K. L. Franklin, A. K. Schwabach, 115 Broadway; L. Falck, 44 West 120th street; William W. Pa-

point, 39 West Thirty-second street; M. L. Hanlon, 112 Westervelt avenue, Plainfield.

Fraser Bay Iron Co., Ltd., Sault Ste. Marie, Ont.; capital, $1,000,000; to mine and smelt ores; provisional directors, Angus McLean, Henry A. Mitchell and Frank H. Waller.

The Republic Motor Car Co. of Canada, Ltd., Toronto; capital, $40,000; provisional directors, Bruce I. Card, Harvey G. Beemer and John W. Payne.

Auto Top & Buggy Co., Ltd., Toronto; capital, $200,000; provisional directors, James E. Day, John M. Ferguson, Edward V. O'Sullivan and others.

Queen City Engineering & Machine Co., Cincinnati; $10,000; by Rudolph Feilhauser, Edmund Feilhauser, Clyde C. Penny, Henry J. Brumlage, Chas. J. Brumlage.

The Canvas Belting Co., Cleveland; $1,000; belting and mill supplies, etc.; by Louis Englander, David F. Bowden, Robert B. McKay, E. W. Richmond, Edna Junke.

Jackson Mfg. Co., Rockford, Ill.; $25,000; to manufacture and deal in machinery for laundry and cleaning purposes; by Charles E. Jackson, Roy C. Jackson and Arthur H. King.

The Ever-Tight Piston Ring Co., St. Louis; $2,100; to manufacture piston rings and piston rod devices, etc.; by A. J. Northcraft, Edward B. Campbell, Walter Hafferkamp.

Hall Iron Co., Cleveland; $15,000; to manufacture structural steel, iron, wire, bronze and other metal work; by Herman Schroeder, A. J. Hall, William L. Bartell, B. A. Fretter, Alex. C. Mackenzie.

Machine Tools

The Fannin & McCullough Sheet Mill Co., Ashland, Ky., which recently took over the plant of the Ashland Sheet Mill Co., is buying additional machinery, including a corrugating machine and a squaring shear.

The Louisville, Ky., Silo & Tank Co., Louisville, Ky., is in the market for a shear, bending machine, automatic thread cutter, bolt cutter and other machinery to be used in making a patented silo. W. C. Curry is secretary and manager.

Financial

The Toledo Plow Co., Toledo, has increased its capital stock from $25,000 to $50,000.

The New Britain Machine Co., New Britain, Conn., has filed a notice with the secretary of state that it has increased its capital stock from $500,000 to $600,000.

The Rockford Milling Machine Co., Rockford, Ill., has increased its capital stock from $25,000 to $100,000.

The Firestone Steel Foundry Co., Chicago, has increased its capital stock from $10,000 to $50,000.

The N. & N. Screw Co., Fostoria, O., has increased its capital stock from $10,000 to $20,000.

Paul L. Miller, receiver of the Wilson Electric Co., Bridgeport, Conn., has filed a certificate of final dissolution of that company.

The Lewis Electric Welding & Mfg. Co., Toledo, has increased its capital stock from $10,000 to $40,000.

Federal Judge Landis has appointed the Central Trust Co. of Illinois receiver of the Streator Motor Car Co., Streator, Ill.

The Calumet Foundry Equipment Co., Harvey, Ill., has sold its plant at Harvey, to James Pettigrew, for $37,500, the purchaser giving back a trust deed to A. W. Underwood to secure a part purchase money mortgage of $27,500 for three years, at 5 per cent.

The idle plant of the Wilmington Iron Co., Wilmington, Del., has been sold by the Equitable Guarantee & Trust Co. as trustee to Henry A. Hitner's Sons Co., of Philadelphia, for $14,025. It is not likely that the plant will be operated. The equipment of the plant consisted of six single and two double puddling furnaces, four heating furnaces and five trains of rolls. The product has been merchant bar iron.

The Standard Sanitary Mfg. Co., Pittsburgh, has increased its capital stock from $7,500,000 to $10,000,000. The new stock is $1,000,000 common and $1,500,000 preferred. At the offices of the company it is stated that the new stock has been practically all sold to the company's stockholders at par. The $2,500,000 derived from the sale of the stock will be used for the general extension of the company's business.

The stockholders of the insolvent Knox Automobile Co., Springfield, Mass., have appointed a committee to formulate a plan for the reorganization of the company. The statement has been made that the assets of the concern total $2,115,902, while the liabilities only amount to $1,252,361. Judge Thomas Z. Lee, of Providence, R. I., a member of the committee, says that negotiations have been entered into with the Old Colony Trust Co., Boston, to act as depository in the plan of reorganization.

General Industrial

Articles of incorporation have been filed at Ottawa, Can., by the Frazer Iron Co., Sault Ste. Marie, Mich., with a capital of $1,000,000.

The Ideal Clock Co., Meriden, Conn., has filed a certificate of organization. Officers are: President, Joseph Petrilol; treasurer, Fred Nadile; secretary, Alphonso Avitabile.

The American Car & Foundry Co., which had provisions for wooden cars only at its Terre Haute, Ind., plant, has equipped it for steel work and put it in operation again.

The Hendricks Mfg. Co., Camden, N. J., has been incorporated with a capitalization of $250,000, by F. R. Hansell, John A. McPeak and F. S. Garmen. It will deal in automobile accessories.

Messrs. R. C. Eckert and George Trudel, of London, Ont., have purchased the property of the Wilcox Mfg. Co., will remodel it and install new machinery for the manufacture of hardware specialties.

The Southern Motors Co. has been organized in Louisville, Ky., with $100,000 capital stock and will erect and equip a large automobile repair shop. Present headquarters are in the Columbia building. The manager of the concern is I. A. Whitehead.

The Saulsberry Wheel Mfg. Co., which was contemplating removal from Jamestown, N. Y., to Ft. Wayne, Ind., has decided not to make the change for the present at least. The new management is said to be in favor of remaining in Jamestown.

The General Rim Co., White Plains, N. Y., has been incorporated with a capital stock of $150,000 by Robert W. Ashley, Frank Oberkirch, both of New York City, and William Kaul, St. Mary's, Pa. The new concern will deal in motor vehicles and parts.

The Standard Steel Construction Co., Ltd., has been incorporated with capital stock of $200,000 with head offices at Toronto; directors, A. McGregor, J. P. McGregor, barristers, and A. E. Wilson, manager, all of Toronto.

The beginning of repairs on the plant of the Ashland Sheet Mill Co., which has been taken over by the new Fannin & McCullough Sheet Mill Co., has been started. The mill will be considerably improved by the time operations start Nov. 15.

The foundry formerly occupied by Headford & Hitchins, Dubuque, Ia., has been purchased by the Kretschmer Mfg. Co., that city. The plant will be improved and operated in

connection with the plant of the Kretschmer company.

General Manager J. P. Johnson, of the New York Engine Co., Watertown, N. Y., has announced the lease for another year of the buildings which the company now occupies in Watertown. Mr. Johnson states that no alterations or improvements will be made other than necessary repairs.

The Wyman & Gordon Co., Worcester, Mass., manufacturer of drop, steam, hammer, hydraulic and steel forgings, which is erecting a large addition to its plant, has bought 30,000 square feet of land opposite its plant. The land will be held for future development.

Articles of incorporation have been filed at Dover, Del., for the United Nut Lock Co., Pittsburgh, Pa. It will have a capital stock of $200,000. Bolts, nuts, chisels and locking devices of all kinds will be manufactured and sold. Incorporators, W. L. Philips, William Robison, Pittsburgh, and W. F. H. Loftis, Dover, Del.

The National Tube Co., Pittsburgh, advises that no definite conclusion has been reached as yet with regard to the rumored addition to its Lorain, O., works. The erection of four open-hearth furnaces and the installation of a combined slabbing and blooming mill are being considered, but no decision has been reached.

The Northern Alabama Coal, Iron & Railway Co., 25 Broad street, New York, with a furnace at Talladega, Ala., is preparing to increase the capacity of its Hammond mines, according to a statement made by Superintendent H. S. Rubidge. An ore picker will be installed, together with a crusher, a new air compressor, with a capacity for running five drills and other equipment.

The Pope-Hartford Co., Boston, has been organized with a capital stock of $100,000, to represent the Pope Mfg. Co., Hartford, Conn. The headquarters and show room are in Copley square. A service station has been established in Cambridge, Mass., containing about 18,000 square feet of floor space, which will be equipped with machinery for repair work of all kinds.

The Hendee Mfg. Co., Springfield, Mass., maker of Indian motorcycles, will increase its payroll from 1,800 to 2,400 by Jan. 1, when the new addition to its plant will be ready for occupancy. The company has installed more than $100,000 worth of new equipment this year and has increased its business 70 per cent. The concern has established a new branch in Denver, and is now arranging to provide a service depot in Atlanta, Ga., as a distributing center for the south.

The Bateman Mfg. Co., of Greenloch, N. J., agricultural implement manufacturer, has purchased for a price estimated at about $125,000, the plant of the Wilkinson Plow Co., including 8¾ acres in the northwestern manufacturing district of Toronto. The Wilkinson Plow Co. assigned about two years ago. The Bateman company will take immediate possession.

Incorporation papers have been filed at Dover, Del., by the Dukesmith Air Brake & Mfg. Co., incorporators, Milton D. Hayes, president, William H. Geib, and Elmer E. Stewart. This organization has been made by Pittsburgh men and the plant will probably be located in that city. It will make a new air brake of special design, for railroad use. The capital stock is to be $1,000,000.

A deal involving $1,000,000 has been closed between the Wisconsin Engine Co., Corliss, Wis., and the M. Rumely Co., Laporte, Ind. The contract embraces the whole output of the Toe Hold orchard tractor, which will be manufactured by the Wisconsin Engine Co., for the M. Rumely Co. Officials of the former concern propose to double the capacity of their plant and the employment of from 500 to 600 extra men.

The Alabama Pipe & Foundry Co., Anniston, Ala., advises that it has no intention of erecting a new foundry, as was reported, but has bought real estate and buildings formerly used as a foundry and will equip same for the manufacture of soil pipe, having as adjuncts to the business a small machine shop and a small pattern shop. The company is at present engaged in the manufacture of its equipment, etc., and expects to turn out the finished product by Dec. 1. The output will be from 15 to 20 tons of cast iron sanitary pipe per day.

The American Coupler Co. and the Auto & Motor Casting Co., Ohio corporations, have been merged under the corporate name of the American Iron & Tin Products Co., jointly owned by an iron and tin mine interest of Rockbridge county, Virginia. The company will take over and rebuild the old Imperial Steel Co. of Ohio, operating what is known as the Biesecker mills, Imperial Station, near Chagrin Falls, O. Lack of working capital rendered this step necesary. The Biesecker mills will be enlarged and operated as a subsidiary of the Imperial Steel Corporation of Delaware, a holding company. In the future the business will be conducted under an Ohio charter, which was taken out recently.

The Craemer Nail & Supply Co., 43-45 West Thirty-fourth street, New York, whose incorporation was recently noted, advises that it will do no building and will require no factory equipment, as it will do a sales business. Henry Craemer, vice president and general sales manager of the company, was formerly connected with the Kendall Nail & Supply Co., and with the Pittsburgh Nail & Supply Co., both of New York. He began as stenographer, and rose to sales manager, resigning to take a position in the sales office of the wire department of the Jones & Laughlin Steel Co., at Pittsburgh, leaving this position last September to take up his present work.

Trade Notes

The Industrial Car Co., Cleveland, has changed its name to the Electric Locomotive & Car Co.

The Western Type Foundry, St. Louis, in order to avail itself of a southern distributing center, has opened offices in New Orleans.

The Ashland Steel Co., which recently installed considerable electrically-driven machinery, is running full time and has all it can do to take care of orders.

Fires

Fire at the plant of the Albion Malleable Iron Co., Albion, Mich., badly damaged a building used for storage purposes. The loss will amount to about $1,500.

The plants of the White-Warner Co., manufacturer of heating apparatus, and the Union Stove Lining Co., in Taunton, Mass., were seriously damaged by fire recently, with a loss of $125,000. The plant of the Weir Stove Co., said to be the largest stove manufacturing establishment in New England, was saved.

The plant of the Bowler Foundry Co., Center street and Columbus road, Cleveland, was badly damaged by fire last week. Bernard Pearson, purchasing agent of the company, is quoted as saying the loss to his firm would reach $50,000 on the building's contents. Valuable patterns to the extent of several thousand dollars, not to mention the machinery, were destroyed, he declared.